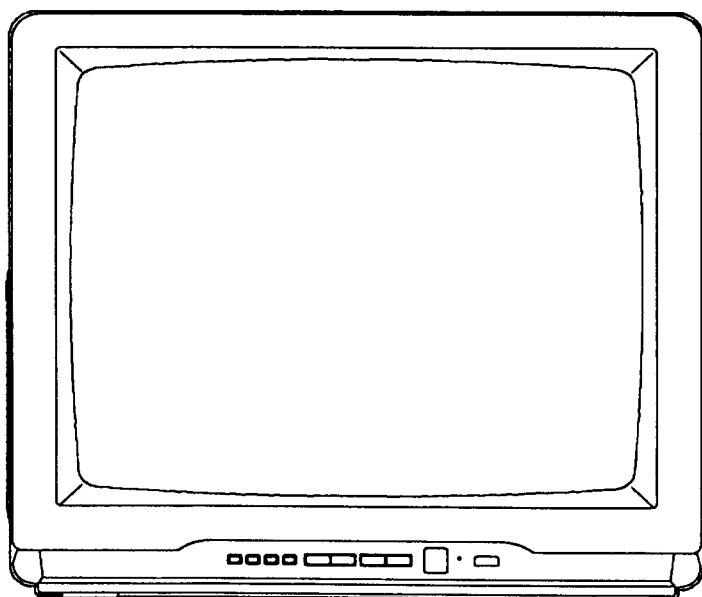




# SERVICE MANUAL

20" COLOR TELEVISION

**TV-2000A MK7**



## IMPORTANT SAFETY NOTICE

Proper service and repair is important to the safe, reliable operation of all Funai Equipment. The service procedures recommended by Funai and described in this service manual are effective methods of performing service operations. Some of these service special tools should be used when and as recommended.

It is important to note that this service manual contains various CAUTIONS and NOTICES which should be carefully read in order to minimize the risk of personal injury to service personnel. The possibility exists that improper service methods may damage the equipment. It also is important to understand that these CAUTIONS and NOTICES ARE NOT EXHAUSTIVE. Funai could not possibly know, evaluate and advise the service trade of all conceivable ways in which service might be done or of the possible hazardous consequences of each way. Consequently, Funai has not undertaken any such broad evaluation. Accordingly, a servicer who uses a service procedure or tool which is not recommended by Funai must first use all precautions thoroughly so that neither his safety nor the safe operation of the equipment will be jeopardized by the service method selected.

## TABLE OF CONTENTS

General Specifications .....	1-1
Performance Specifications .....	2-1
Important Safety Precautions.....	3-1
Disassembly Instructions .....	4-1
Electrical Adjustment Instructions .....	5-1
Block Diagram.....	6-1
Schematic Diagrams / PCB's and Test Points.....	7-1
Waveforms .....	8-1
Wiring Diagram .....	9-1
Exploded View .....	10-1
Mechanical Parts List.....	11-1
Electrical Parts List.....	12-1

## GENERAL SPECIFICATIONS \*

### FEATURE and SPECIFICATIONS

Color System:	PAL - B/G, SECAM - B/G, D/K NTSC 4.43/3.58MHz (Video In only)
Tuning System:	Voltage Synthesizer
Receivable Channels:	VHF-L; R1-R5 / - (OIRT + CCIR ch) - E2-E4 ch (X-S2) VHF-H; R6-R12 / E5-E12 ch (S3-S10) UHF; 21-69 ch CATV-Mid
Numer of Present:	up to 50
Antenna Impedance:	UHF/VHF 75Ω, Unbalanced
Picture Tube:	14", Tinted
Picture Control:	Color, Brightness, (Remote) Contrast and Video mode (Sharp/Soft)
Picture Control Memory:	Standard - Select (Remote)
Speaker:	77m/m, Round Type, 8Ω
Output Power:	1W, 10% THD
Other Features:	Automatic Channel Programming Automatic Degaussing
Power Source:	220-240V, 50Hz AC
Power Consumption:	70W
Cabinet Size:	366(W) x 35(D) x 32(H) mm (Approx)
Weight:	9Kg (Approx)
Regulations:	IEC-65 Passable

### CONTROL and SWITCHES

Power:	Push (Front)
Channel Up/Down:	Push (Front)
Volume Up/Down:	Push (Front)
Tuning Up/Down:	Push (Front)
Program:	Push (Front)
Auto Memo/Band:	Push (Front)
Remote Control:	Standby (20keys)
0/AV 1-9	Channel Up/Down
Control& Volume Up/Down	Picture Select (Bright/Contrast/ Color/Video Mode)
Previous	Previous
Mute	Mute
Sleep	Sleep
Display	Display

### DISPLAY

LED Indicator:	LED (Red)
	* When turning on the power, the stand-by LED will turn off.
On Screen Display:	Channel Volume Brightness Color Contrast Sharp-Soft Sleep Timer (10~90 Minute) Tuning Indicator Band Position

### JACK AND TERMINALS

UHF/VHF Antenna:	75Ω IEC Jack
Video In Jack:	BNC Jack
Audio In Jack:	RCA Jack
EARPHONE:	3.5mm CES

### ACCESSORIES

Remote Control Transmitter	
Battery:	UM3 x 2
Owner's Manual	
Rod Antenna	

\* Specifications are subject to change without notice.

# PERFORMANCE SPECIFICATIONS

## < Tuner >

ANT. Input ----- 75Ω Unbalanced, IEC connector  
 Reference Level ----- 300mVp-p at Video Output  
 Test Input Signal ----- 400Hz 30% modulation

<u>Description</u>	<u>Condition</u>	<u>Unit</u>	<u>Nominal</u>	<u>Limit</u>
1. Peak Picture Sens	VHF	dB $\mu$ V	20	30
	UHF	dB $\mu$ V	30	40
2. AFT Pull In Range (80dB $\mu$ input)	—	MHz	± 1.0	± 0.7
3. Intermediate Freq.	Picture Sound Sound	MHz MHz MHz	38.0 31.5 (D/K) 32.5 (B/G)	— — —
4. Intercarrier Freq.	— —	MHz MHz	6.5 (D/K) 5.5 (B/G)	— —

## < Deflection >

<u>Description</u>	<u>Condition</u>	<u>Unit</u>	<u>Nominal</u>	<u>Limit</u>
1. Deflection Freq.	Horizontal (PAL/SECAM) (NTSC)	KHz	15.625	—
		KHz	15.75	—
	Vertical (PAL/SECAM) (NTSC)	Hz	50	—
		Hz	60	—
2. Linearity	Horizontal Vertical	% %	— —	± 15 ± 15
3. High Voltage	—	KV	23	—

## < Video & Chroma >

<u>Description</u>	<u>Condition</u>	<u>Unit</u>	<u>Nominal</u>	<u>Limit</u>
1. Misconvergence	Center	mm	—	0.4
	Side	mm	—	1.5
	Corner	mm	—	2.0
2. Over Scan	Horizontal	%	10	—
	Vertical	%	10	—
3. Color Temperature	—	K	8000K-10MPCD	—
4. Resolution	Horizontal	Line	300	—
	Vertical	Line	300	—
5. Brightness	APL 100%	Ft-L	45	35

## < Audio >

All items are measured across 16Ω resistor at speaker output terminal.

<u>Description</u>	<u>Condition</u>	<u>Unit</u>	<u>Nominal</u>	<u>Limit</u>
1. Audio Output Power	10% THD	W	1.2	0.8
2. Audio Distortion	500mW	%	2	5
3. Audio Freq. Response	-6dB	Hz	—	100~6K

# IMPORTANT SAFETY PRECAUTIONS

Prior to shipment from the factory, our products are strictly inspected for recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

## Safety Precautions for TV Circuit

**1. Before returning an Instrument to the customer,** always make a safety check of the entire instrument, including, but not limited to, the following items:

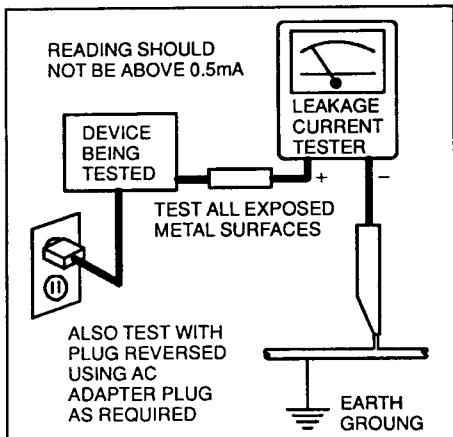
a. Be sure that no built-in protective devices are defective and have been defeated during servicing. (1) Protective shields are provided on this chassis to protect both the technician and the customer. Correctly replace all missing protective shields, including any removed for servicing convenience. (2) When reinstalling the chassis and/or other assembly in the cabinet, be sure to put back in place all protective devices, including but not limited to, nonmetallic control knobs, insulating fishpapers, adjustment and compartment covers/shields, and isolation resistor/capacitor networks. **Do not operate this instrument or permit it to be operated without all protective devices correctly installed and functioning. Servicers who defeat safety features or fail to perform safety checks may be liable for any resulting damage.**

b. Be sure that there are no cabinet openings through which an adult or child might be able to insert their fingers and contact a hazardous voltage. Such openings include, but are not limited to, (1) spacing between the picture tube and the cabinet mask, (2) excessively wide cabinet ventilation slots, and (3) an improperly fitted and/or incorrectly secured cabinet back cover.

c. **Antenna Cold Check** - With the instrument AC plug removed from any AC source, connect an electrical jumper across the two AC plug prongs. Place the instrument AC switch in the on position. Connect one lead of an ohmmeter to the AC plug prongs tied together and touch the other ohmmeter lead in turn to each tuner antenna input exposed terminal screw and, if applicable, to the coaxial connector. If the measured resistance is less than 1.0 megohm or greater than 5.2 megohm, an abnormality exists that must be corrected before the instrument is returned to the customer.

Repeat this test with the instrument AC switch in the off position.

**d. Leakage Current Hot Check** - With the instrument completely reassembled, plug the AC line cord directly into a AC outlet. (Do not use an isolation transformer during this test.) Use a leakage current tester. With the instrument AC switch first in the on position and then in the off position, measure from a known earth ground (metal water pipe, conduit, etc.) to all exposed metal parts of the instrument (antennas, handle brackets, metal cabinet, screw heads, metallic overlays, control shafts, etc.), especially any exposed metal parts that offer an electrical return path to the chassis. Any current measured must not exceed 0.5 milliampere. Reverse the instrument power cord plug in the outlet and repeat the test.



ANY MEASUREMENTS NOT WITHIN THE LIMITS SPECIFIED HEREIN INDICATE A POTENTIAL SHOCK HAZARD THAT MUST BE ELIMINATED BEFORE RETURNING THE INSTRUMENT TO THE CUSTOMER OR BEFORE CONNECTING THE ANTENNA OR ACCESSORIES.

**e. X-Radiation and High Voltage Limits** - Because the picture tube is the primary potential source of X-radiation in solid-state TV receivers, it is specially constructed to prohibit X-radiation emissions. For continued X-radiation protection, the replacement picture tube must be the same type as the original. Also, because the picture tube shields and mounting hardware perform an X-radiation protection function, they must be correctly in place. High voltage must be measured each time servicing is performed that involves B+, horizontal deflection or high voltage. Correct operation of the X-radiation protection circuits also must be reconfirmed each time they are serviced. (X-radiation protection circuits also may be called "horizontal disable" or "hold down.") Read and apply the high voltage limits and, if the chassis is so equipped, the X-radiation protection circuit specifications given on instrument labels and in the Product Safety & X-Radiation Warning note on the service data chassis schematic. High voltage is maintained within specified limits by close tolerance safety-related components/adjustments in the high-voltage circuit. If high voltage exceeds specified limits, check each component specified on the chassis schematic and take corrective action.

**2. Read and comply with all caution and safety-related notes on or inside the receiver cabinet, on the receiver chassis, or on the picture tube.**

**3. Design Alteration Warning** - Do not alter or add to the mechanical or electrical design of this TV receiver. Design alterations and additions, including, but not limited to circuit modifications and the addition of items such as auxiliary audio and/or video output connections, might alter the safety characteristics of this receiver and create a hazard to the user. Any design alterations or additions will void the manufacturer's warranty and may make you, the servicer, responsible for personal injury or property damage resulting therefrom.

**4. Picture Tube Implosion Protection Warning** - The picture tube in this receiver employs integral implosion protection. For continued implosion protection, replace the picture tube only with one of the same type number. Do not remove, install, or otherwise handle the picture tube in any manner without first putting on shatterproof goggles equipped with side shields. People not so equipped must be kept safely away while picture tubes are handled. Keep the picture tube away from your body. Do not handle

the picture tube by its neck. Some "in-line" picture tubes are equipped with a permanently attached deflection yoke; because of potential hazard, do not try to remove such "permanently attached" yokes from the picture tube.

## 5. Hot Chassis Warning

a. Some TV receiver chassis are electrically connected directly to one conductor of the AC power cord and may be safety-serviced without an isolation transformer only if the AC power plug is inserted so that the chassis is connected to the ground side of the AC power source. To confirm that the AC power plug is inserted correctly, with an AC voltmeter, measure between the chassis and a known earth ground. If a voltage reading in excess of 1.0V is obtained, **\*remove and reinsert the AC power plug in the opposite polarity** and again measure the voltage potential between the chassis and a known earth ground.

b. Some TV receiver chassis have a circuit which obtain voltage about 70% of AC voltage between chassis and earth ground regardless of the AC plug polarity. This chassis can be safety-serviced only with an isolation transformer inserted in the power line between the receiver and the AC power source, for both personnel and test equipment protection.

c. Some TV receiver chassis have a secondary ground system in addition to the main chassis ground. This secondary ground system is not isolated from the AC power line. The two ground systems are electrically separated by insulation material that must not be defeated or altered.

Note: \* In case unit has no polarity AC plug only.

6. Observe original lead dress. Take extra care to assure correct lead dress in the following areas: a. near sharp edges, b. near thermally hot parts-be sure that leads and components do not touch thermally hot parts, c. the AC supply, d. high voltage, and e. antenna wiring. Always inspect in all areas for pinched, out of place, or frayed wiring. Check AC power cord for damage.

7. Components, parts, and/or wiring that appear to have overheated or are otherwise damaged should be replaced with components, parts, or wiring that meet original specifications. Additionally, determine the cause of overheating and/or damage and, if necessary, take corrective action to remove any potential safety hazard.

**8. Product Safety Notice** - Some electrical and mechanical parts have special safety-related characteristics which are often not evident from visual

inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc.. Parts that have special safety characteristics are identified by a (  $\Delta$  ) on schematics and in parts lists. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire, and/or other hazards. The Product's Safety is under review continu-

## Precautions during Servicing

- A. Parts identified by the (  $\Delta$  ) symbol are critical for safety. Replace only with part number specified.
- B. In addition to safety, other parts and assemblies are specified for conformance with regulations applying to spurious radiation. These must also be replaced only with specified replacements. Examples: RF converters, RF cables, noise blocking capacitors, and noise blocking filters, etc.
- C. Use specified internal wiring. Note especially:
  - 1) Wires covered with PVC tubing
  - 2) Double insulated wires
  - 3) High voltage leads
- D. Use specified insulating materials for hazardous live parts. Note especially:
  - 1) Insulation Tape
  - 2) PVC tubing
  - 3) Spacers
  - 4) Insulators for transistors.
- E. When replacing AC primary side components (transformers, power cord, etc.), wrap ends of wires securely about the terminals before soldering.
- F. Observe that the wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)
- G. Check that replaced wires do not contact sharp edged or pointed parts.

ously and new instructions are issued whenever appropriate. Prior to shipment from the factory, our products are strictly inspected to confirm with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

H. When a power cord has been replaced, check that 10-15 kg of force in any direction will not loosen it.

I. Also check areas surrounding repaired locations.

J. Use care that foreign objects (screws, solder droplets, etc.) do not remain inside the set.

### K. Crimp type wire connector

When replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, in order to prevent shock hazards, perform carefully and precisely the following steps.

#### Replacement procedure

- 1) Remove the old connector by cutting the wires at a point close to the connector.
- Important: Do not re-use a connector (discard it).
- 2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.
- 3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.
- 4) Use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

L. When connecting or disconnecting the VCR connectors, first, disconnect the AC plug from AC supply socket.

## Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions. Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

### 1. Clearance Distance

When replacing primary circuit components, confirm specified clearance distance (d) and (d') between soldered terminals, and between terminals and surrounding metallic parts. (See Fig. 1)

Table 1 : Ratings for selected area

AC Line Voltage	Region	Clearance Distance (d) (d')
200 to 240 V	Europe Australia	$\geq 4\text{mm}$ (d) $\geq 6\text{mm}$ (d')

Note: This table is unofficial and for reference only. Be sure to confirm the precise values.

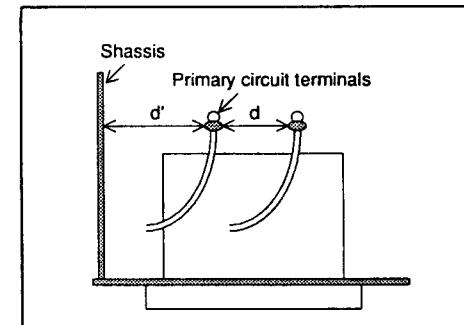


Fig. 1

### 2. Leakage Current Test

Confirm specified (or lower) leakage current between B (earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

#### Measuring Method : (Power ON)

Insert load Z between B (earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See Fig. 2 and following table.

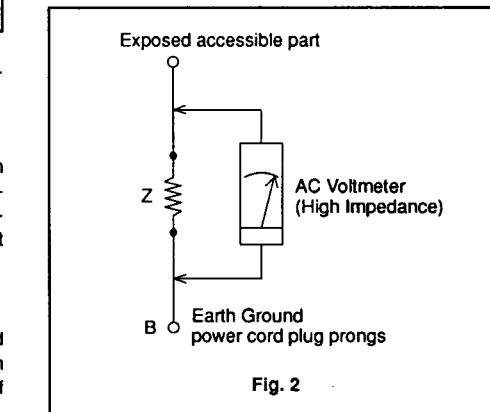


Fig. 2

Table 2 : Leakage current ratings for selected areas

AC Line Voltage	Region	Load Z	Leakage Current (i)	Earth Ground (B) to:
200 to 240 V	Europe Australia	2k $\Omega$ RES. in connected	$i \leq 0.7\text{mA rms}$ $i \leq 2\text{mA dc}$	Antenna terminals
		50k $\Omega$ RES. in connected	$i \leq 0.7\text{mA rms}$ $i \leq 2\text{mA dc}$	Other terminals

Note: This table is unofficial and for reference only.

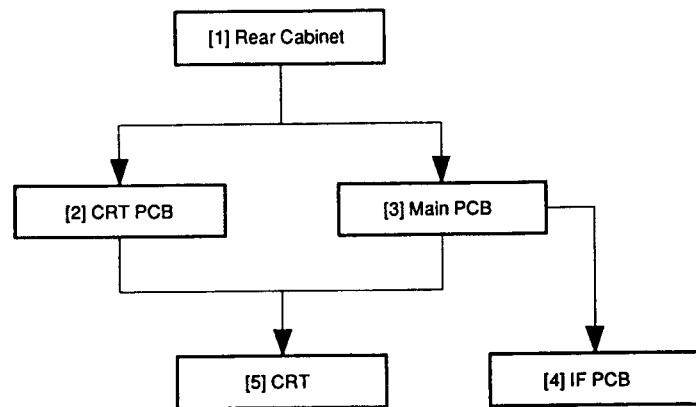
Be sure to confirm the precise values.

# DISASSEMBLY INSTRUCTIONS

## 1. DISASSEMBLY FLOW CHART

This flow chart indicates the disassembly steps of the cabinet parts and PCB in order to gain access to item(s) to be serviced. When reassembling, perform the step(s) in the reverse order. Bend, route and dress the cables as they were originally.

**CAUTION ! :** When removing the CRT, make sure to discharge Anode Lead of the CRT.  
Use the CRT Ground Wire to discharge the CRT before removing the Anode Cap.



## Reference <Notes> in Table

- (1) Remove 5 screws (L2, L3) and slide the Rear Cabinet backward.
- (1) If not already removed, first remove the Rear Cabinet.  
(2) Remove all relative wires, then pull the CRT PCB backward.
- (1) If not already removed, first remove the Rear Cabinet.  
(2) Remove all relative wires on the Main PCB and remove the Anode Cap, then slide the main PCB backward.
- (1) If not already removed, first remove the Rear Cabinet.  
(2) Desolder CN101 and CN102, then remove the IF PCB from the Main PCB.

### Caution !

Discharge Anode Lead of the CRT with the CRT Ground Wire before removing the Anode Cap.

- (1) If not already removed, first remove the Rear Cabinet and Main PCB.  
(2) Remove 4 screws (B2), then the CRT can be removed.

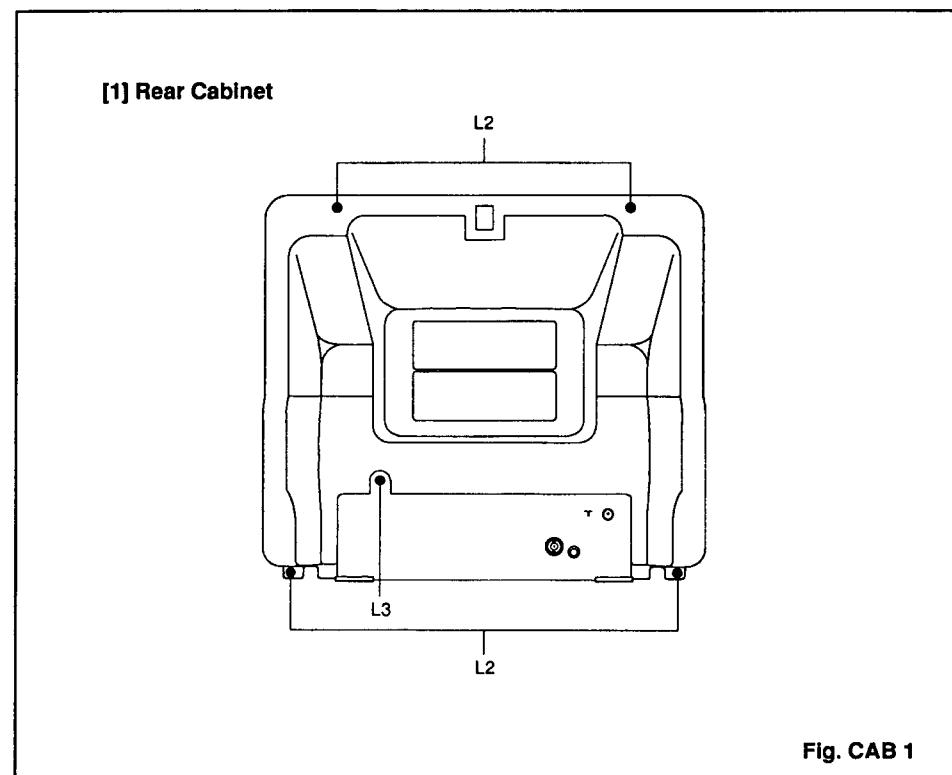
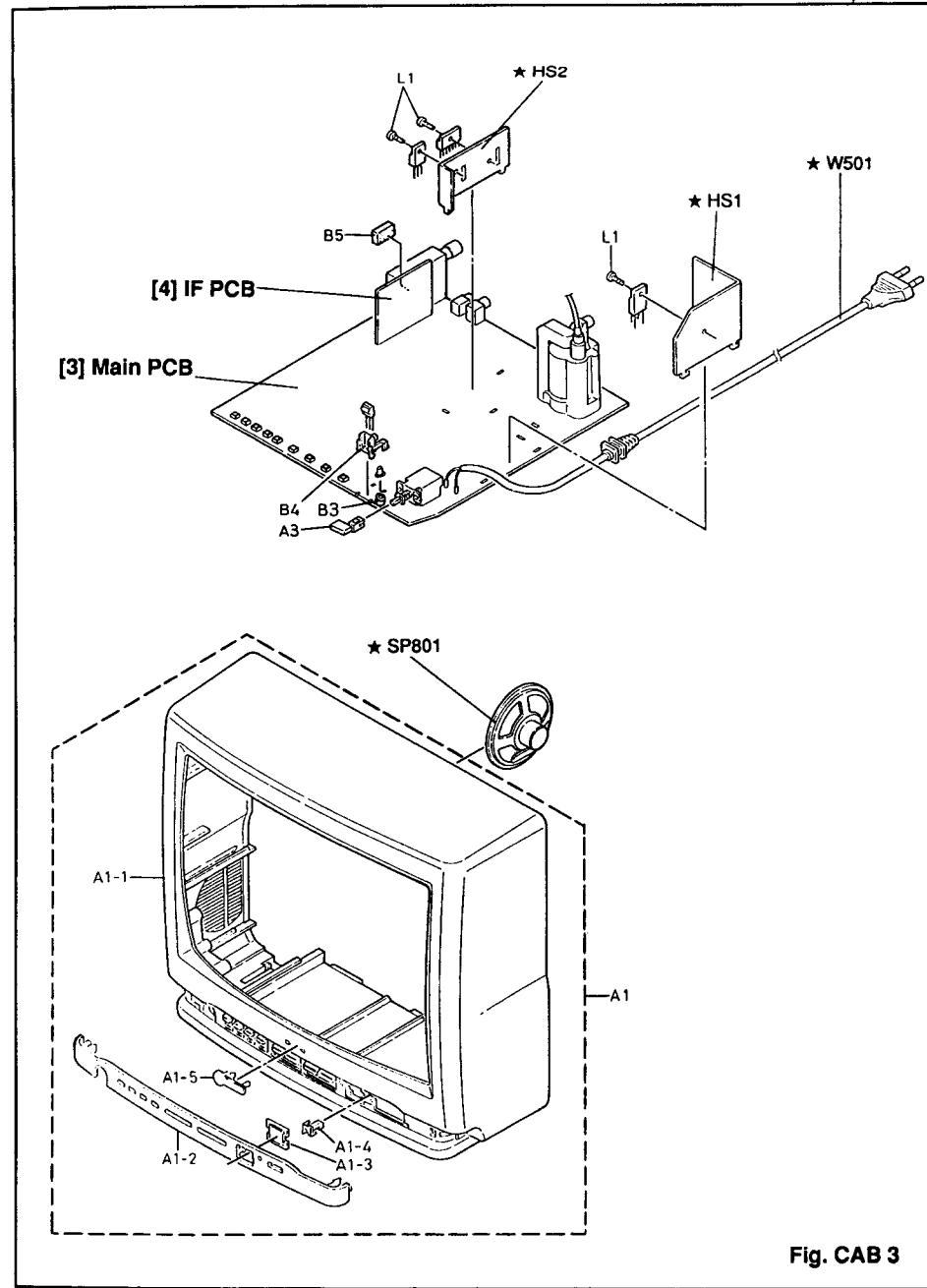
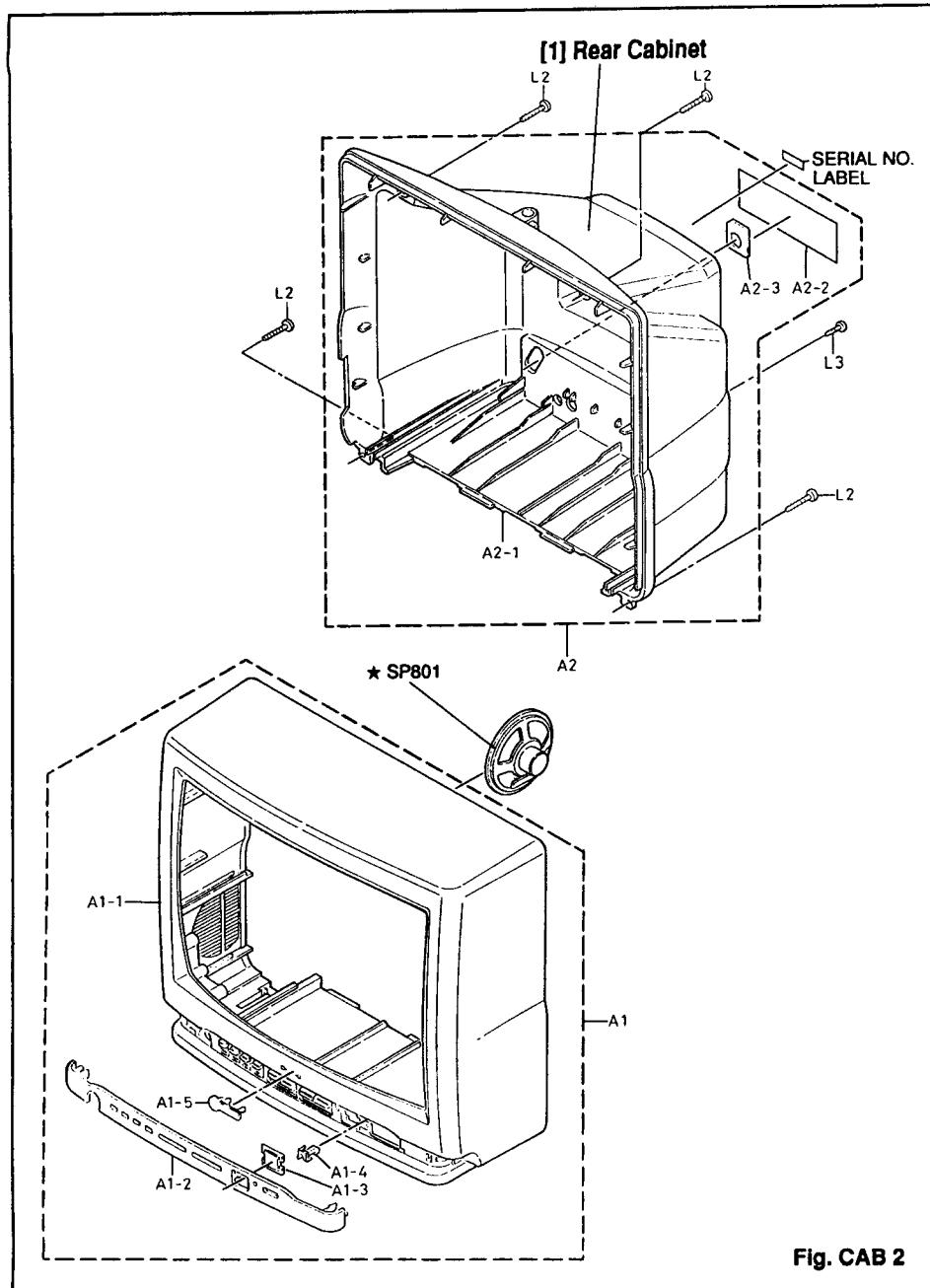


Fig. CAB 1

## 2. DISASSEMBLY METHOD

STEP / LOC. NO.	PART	REMOVAL		
		FIG. NO.	REMOVE / *UNLOCK / RELEASE / UNPLUG / UNCLAMP / DESOLDER	NOTE
[1]	Rear Cabinet	CAB1 CAB2	L2 (4pcs), L3	1
[2]	CRT PCB	CAB4 CAB5	CN602, CN603, CN604 FOCUS WIRE, SCREEN WIRE	2
[3]	Main PCB	CAB3 CAB5	CN201, CN202, CN203, CN204, CN208, CN501 ANODE CAP, FOCUS WIRE, SCREEN WIRE	3
[4]	IF PCB	CAB3	CN101, CN102	4
[5]	CRT	CAB4	B2 (4pcs)	5



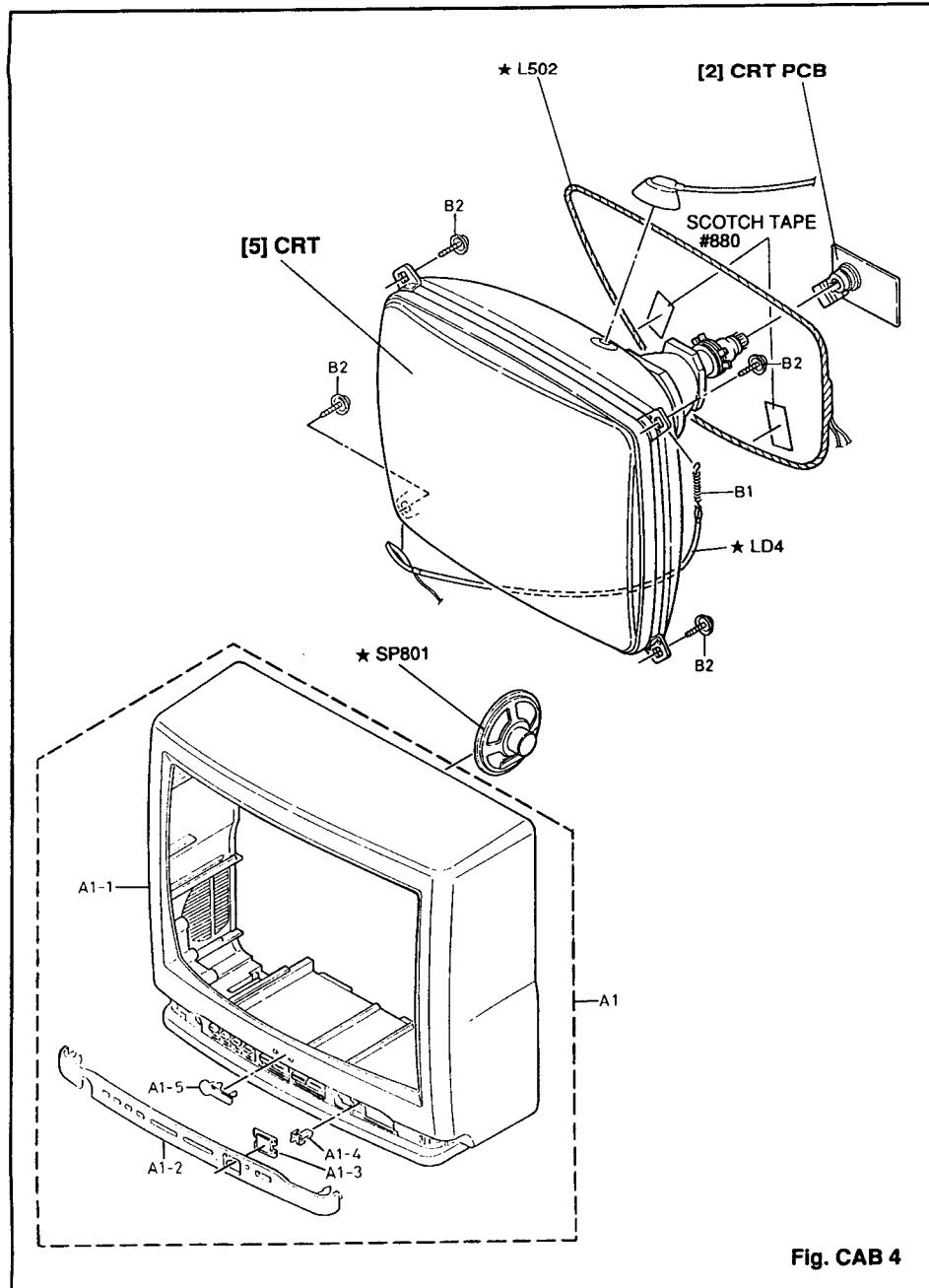
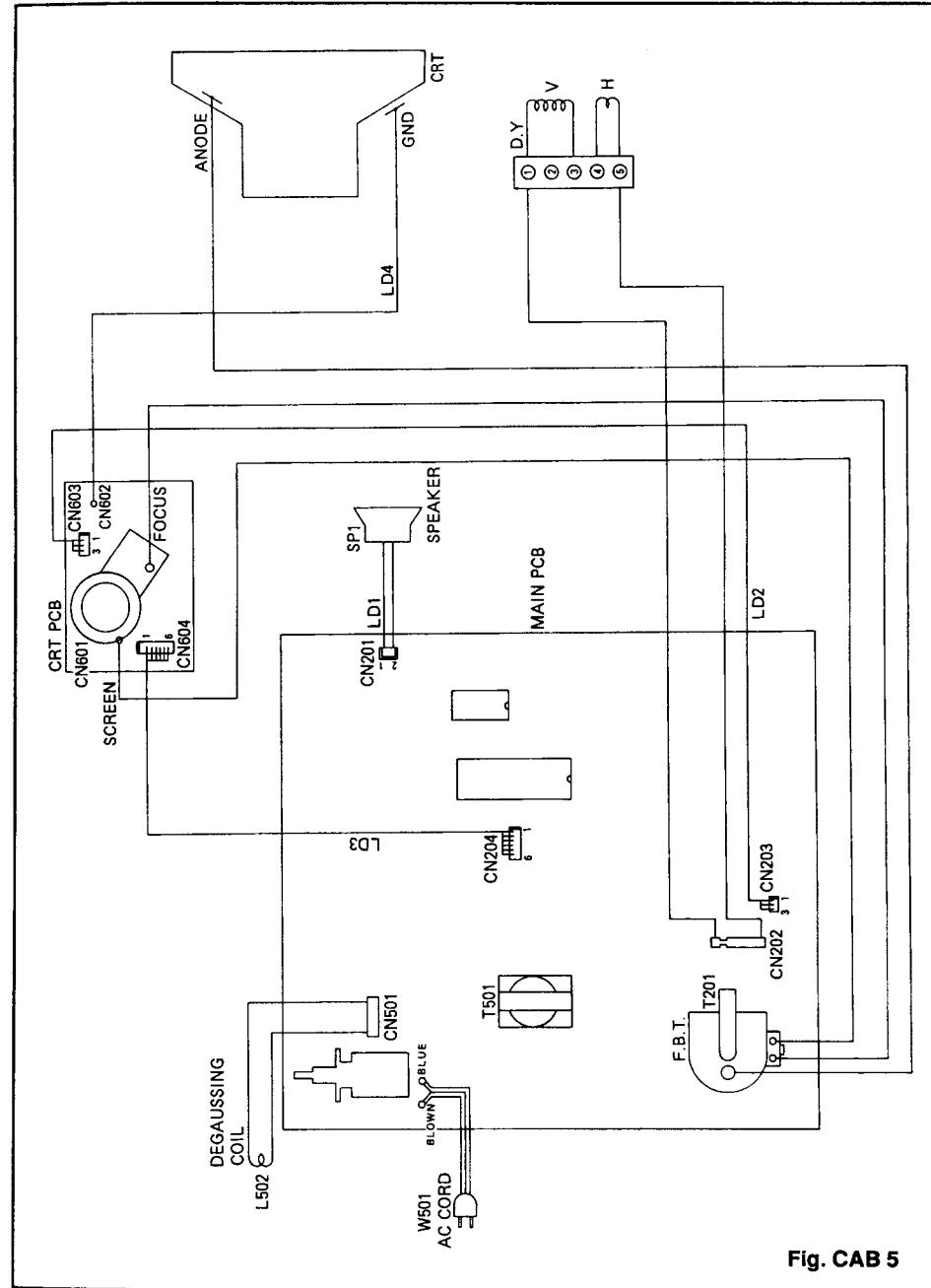


Fig. CAB 4



**Fig. CAB 5**

# ELECTRICAL ADJUSTMENT INSTRUCTIONS

## NOTE:

Electrical adjustments are required after replacing circuit components. It is important to perform these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.

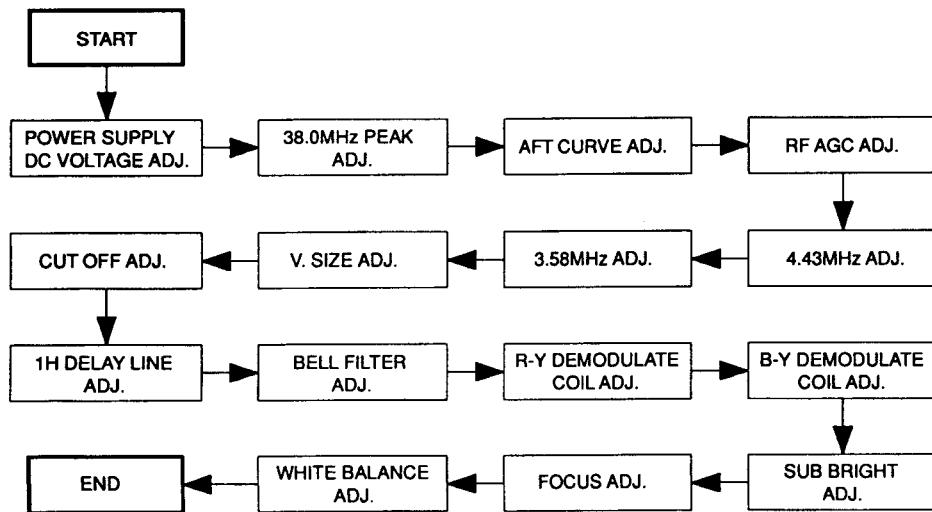
## TEST EQUIPMENT REQUIRED:

1. IF Sweeper
2. DC Volt Meter
3. Oscilloscope: Dual Trace with 10:1 probe
4. PAL, SECAM and NTSC Pattern Generator
5. Monoscope
6. Color Analyzer

## HOW TO SET UP THE ADJUSTMENT MODE:

**Preset Mode:** Press picture select button on the remote control unit, then press the number "1" button.

Brightness ----- Center  
 Color ----- Center  
 Contrast ----- Approx 70%



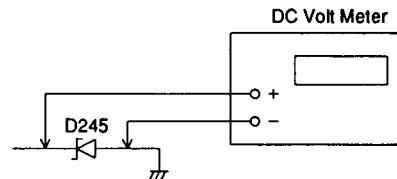
## 1. POWER SUPPLY DC VOLTAGE ADJUSTMENT

**Purpose:** To get correct voltage.

**Symptom of Misadjustment:** If voltage is incorrect, picture is dark.

Test Point	Adjustment Point	Input
D245	VR205	---
Equipment		Spec.
DC Volt Meter		DC +114±0.5V

### Connections of M. EQ.



**Reference Notes:** D245, VR205 --- MAIN PCB

1. To inactivate FBT, ground the base of Q220.
2. Connect both terminal of C343 by 1KΩ (60W~80W).
3. Connect the equipment as shown in the above table.
4. Adjust VR205 for reading +114±0.5V on the DC Volt Meter.

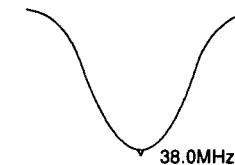
## 2. 38.0MHz PEAK ADJUSTMENT (for TUNER)

**Purpose:** To adjust PIF (Picture Intermediate Frequency).

**Symptom of Misadjustment:** Beat may appear on the picture and buzz may sound.

Test Point	Adjustment Point	Input
IC101 6pin, 16pin	L106	---
Equipment		Spec.
IF Sweeper, Oscilloscope		See below

### Figure



**Reference Notes:** IC101, L106 --- IF PCB

1. Connect Output of sweeper to 6pin of IC101.  
 Frequency set of sweeper are below:  
 (1) 31.5MHz (2) 32.4MHz (3) 33.57MHz (4) 35.8MHz (5) 38.0MHz (6) 39.45MHz
2. Connect the oscilloscope to 16pin of IC101.
3. Load DC Voltage to 4pin of IC101 as the wave of oscilloscope not to clip.
4. Adjust L106 as the marker for 38.0MHz to be peak.

### 3. AFT CURVE ADJUSTMENT (for TUNER)

Purpose: To operate AFT correctly.

Symptom of Misadjustment: AFT does not work correctly and/or synchronism will be faulty.

Test Point	Adjustment Point	Input
IC101 6pin, 11pin	L107	---
Equipment	Spec.	
IF Sweeper, Oscilloscope	See below	

Figure

Reference Notes: SW206 --- MAIN PCB IC101, L107 --- IF PCB

1. Connect output of sweeper to 6pin of IC101. Frequency set is the same as for 38.0MHz Peak Adjustment.
2. Connect the oscilloscope to 11pin of IC101.
3. Push SW206 to disengage AFT action.
4. Adjust L107 as the marker for 38.0MHz to the center of AFT curve.

### 4. RF AGC ADJUSTMENT (for TUNER)

Purpose: Set AGC (Auto Gain Control) Level.

Symptom of Misadjustment: AGC does not synchronize correctly when RF Input Level is weak and distortion may cause on the picture when it is strong.

Test Point	Adjustment Point	Input
TU201 6pin	VR101	PAL Color Bar
Equipment	Spec.	
PAL Pattern Generator, DC Volt Meter	DC +4.1±0.1V	

Connections of M. EQ.

Reference Notes: TU201 --- MAIN PCB VR101 --- IF PCB

1. Receive the PAL Color Bar signal for 2ch (48.25MHz). (RF input level 80dB $\mu$ V at the best synchronized point)
2. Connect the equipment as shown in the above table.
3. Adjust VR101 for reading +4.1±0.1V on the DC Volt Meter.

### 5. 4.43MHz ADJUSTMENT

Purpose: To adjust the color sub-carrier frequency of PAL and SECAM.

Symptom of Misadjustment: No color when receiving PAL and SECAM signal.

Test Point	Adjustment Point	Input
Screen	C299	PAL Red Raster
Equipment	Spec.	
PAL Pattern Generator	See below	

Figure

Picture is rolling or unstable.

(Pink)

<Turn C299>

(Purple)

Whole Screen Red Picture is stable.

Reference Notes: C299 --- MAIN PCB

1. Input the PAL Red Raster.
2. Check picture. A. If Red picture is stable. ....OK
- B. If Red picture is rolling or unstable, adjust C299 until stable.

### 6. 3.58MHz ADJUSTMENT

Purpose: To adjust the color sub-carrier frequency of NTSC.

Symptom of Misadjustment: No color when receiving NTSC signal.

Test Point	Adjustment Point	Input
Screen	C298	NTSC Red Raster
Equipment	Spec.	
NTSC Pattern Generator	See below	

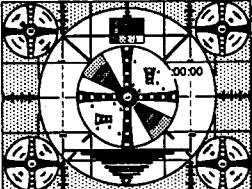
Reference Notes: C298 --- MAIN PCB

1. Input the NTSC Red Raster.
2. Check picture. Procedure is the same as for 4.43MHz Adjustment.

## 7. V. SIZE ADJUSTMENT

**Purpose:** To get correct vertical size of screen image.

**Symptom of Misadjustment:** Vertical size of screen image may not be properly displayed.

Test Point	Adjustment Point	Input
Screen	VR204	Monoscopic Pattern
Equipment		Spec.
Monoscope		90±5%
<b>Figure</b>		
		

**Reference Note:** VR204 --- MAIN PCB

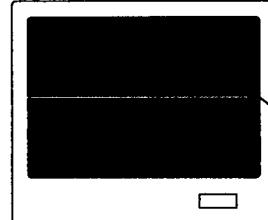
1. Operate the unit more than 20 minutes.
2. Input the Monoscopic Pattern.
3. Adjust VR204 so that the vertical size will be 90±5% of Monoscopic Pattern and the circle is round.

## 8. CUT OFF ADJUSTMENT

**Purpose:** To adjust the beam current of R, G, B and screen voltage.

**Symptom of Misadjustment:** White color may be reddish, greenish or bluish.

When the screen voltage is too high, the scanning line is appeared on the screen.

Test Point	Adjustment Point	Input
Screen	VR604, VR605, VR606 Screen-VR (FBT)	Black Raster
Equipment		Spec.
Pattern Generator		See below
<b>Figure</b>		
		

**Reference Notes:** VR601, VR602, VR603, VR604, VR605, VR606 --- CRT PCB

SW209 --- MAIN PCB

Screen-VR --- MAIN PCB (FBT)

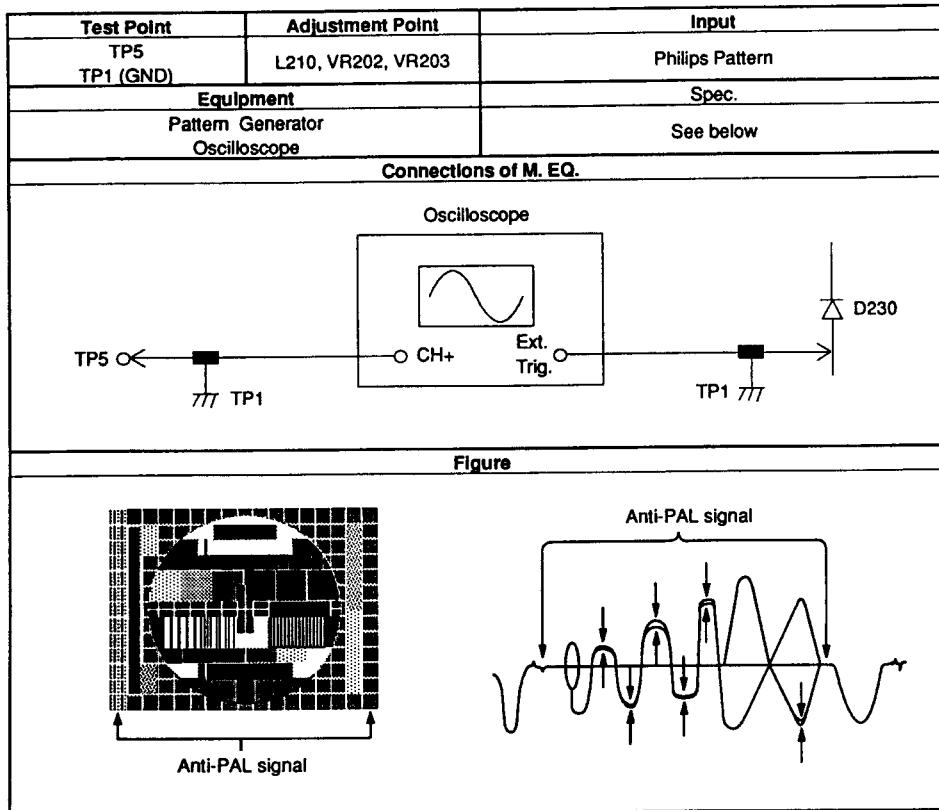
1. Operate the unit more than 20 minutes.
2. Degauss the CRT using Degaussing Coil.
3. Input the Black Raster.
4. Turn the Screen-VR (FBT) fully counterclockwise.
5. Set VR602 (B. Drive), VR603 (R. Drive), VR604 (B. Cut Off), VR605 (G. Cut Off), VR606 (R. Cut Off) and VR601 (Sub Bright) to center.
6. Set the SW209 (Service SW) to ON.
7. Slowly turn the Screen-VR (FBT) to the point where horizontal line just visible.
8. Adjust VR604 (Blue), VR605 (Green) and VR606 (Red) so that horizontal line becomes pure white.
9. Turn off the SW209 (Service SW).

**Note:** Confirm that White Balance Adj. is correct after this adjustment, and attempt White Balance Adj. if needed.

## 9. 1 H DELAY LINE ADJUSTMENT (for PAL)

**Purpose:** To get correct 1H delay line when the PAL signal is entered.

**Symptom of Misadjustment:** The Anti-PAL signal part is colored when the Philips Pattern is entered.  
Each scanning line is colored on the color bar.



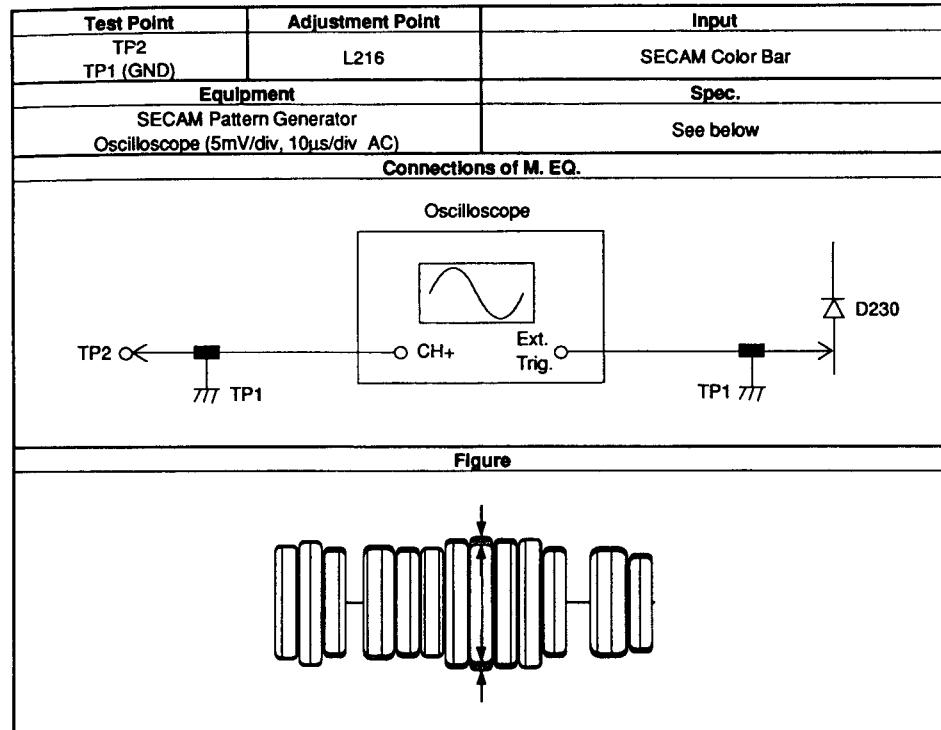
**Reference Notes:** D230, TP1, TP5, L210, VR202, VR203 --- MAIN PCB

1. Input the Philips Pattern.
2. Connect the equipment as shown in the above table.
3. Adjust VR202 VR203 and L210 so that the amplitude at Anti-PAL signal part becomes minimum (no color) and the waveform at the color bar part is not seen in double ("Venetian Blind" does not appear at the color bar signal part).

## 10. BELL FILTER ADJUSTMENT (for SECAM)

**Purpose:** To adjust the center frequency of SECAM bell filter.

**Symptom of Misadjustment:** The color will be reversed when the SECAM signal is entered.



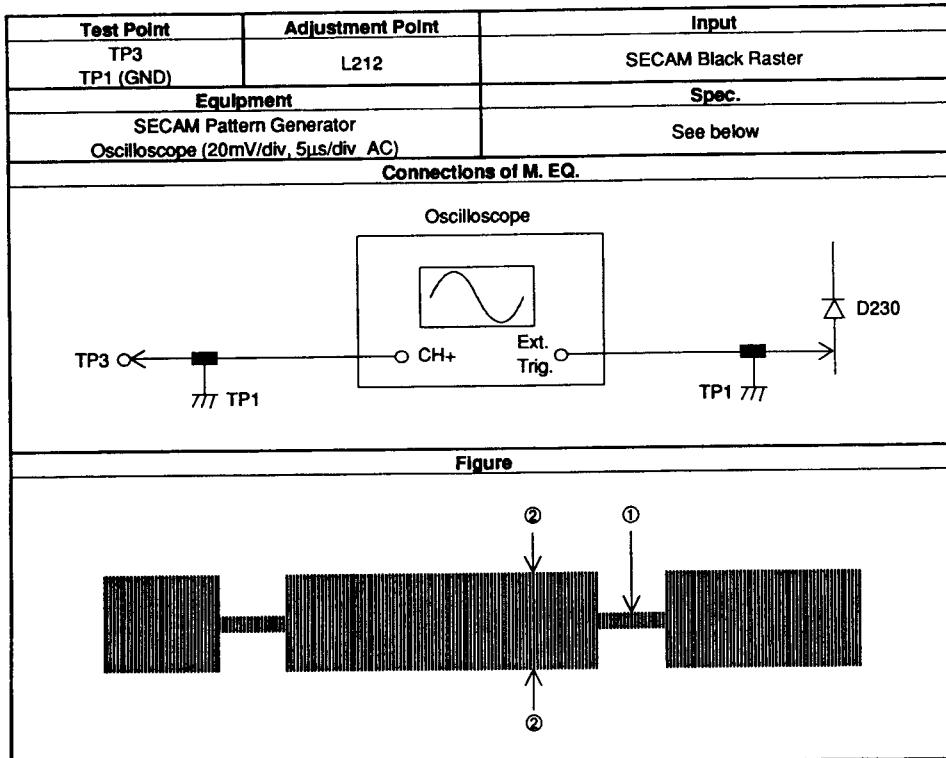
**Reference Notes:** D230, TP1, TP2, L216 --- MAIN PCB

1. Input the SECAM Color Bar signal.
2. Connect the equipment as shown in the above table.
3. Set oscilloscope to 10 : 1 probe, AC 5mV/div and Range 10μs/div.
4. Adjust L216 with core driver to flat waveform.

## 11. R-Y DEMODULATE COIL ADJUSTMENT (for SECAM)

**Purpose:** To adjust the level of R-Y color difference signal.

**Symptom of Misadjustment:** The R, G and B will be unbalanced.



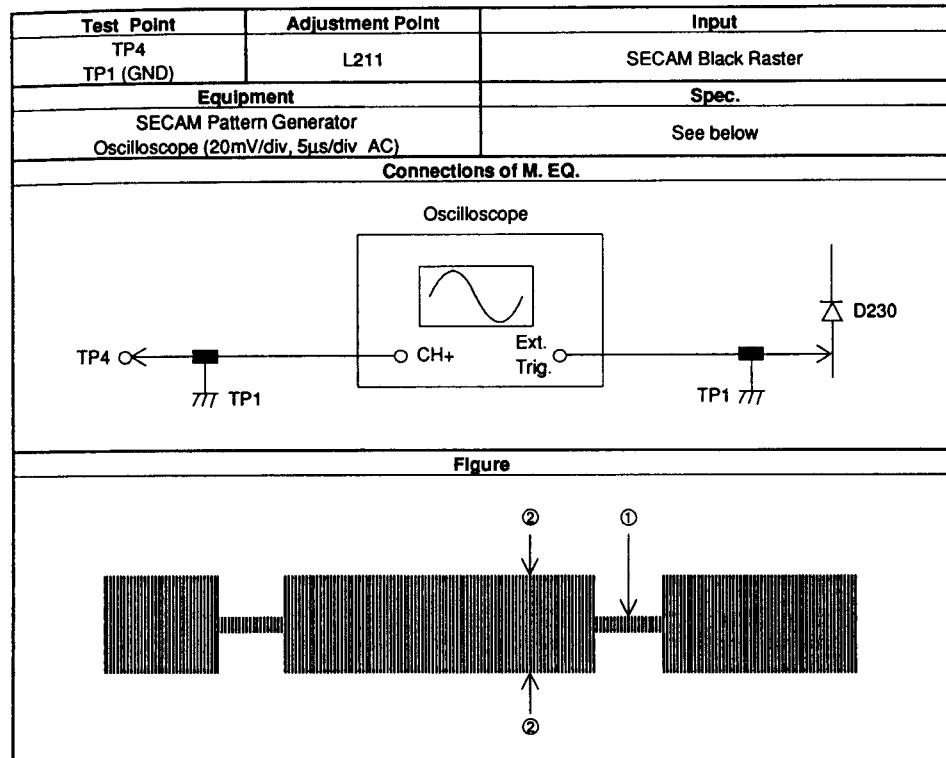
**Reference Notes:** D230, TP1, TP3, L212 --- MAIN PCB

1. Connect the equipment as shown in the above table.
2. Input the SECAM Black Raster.
3. Adjust L212 with core driver so that ① becomes center of ② as shown in the above table.

## 12. B-Y DEMODULATE COIL ADJUSTMENT (for SECAM)

**Purpose:** To adjust the level of B-Y color difference signal.

**Symptom of Misadjustment:** The R, G and B will be unbalanced.



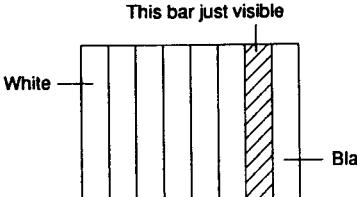
**Reference Notes:** D230, TP1, TP4, L211 --- MAIN PCB

1. Connect the equipment as shown in the above table.
2. Input the SECAM Black Raster.
3. Adjust L211 with core driver so that ① becomes center of ② as shown in the above table.

## 13. SUB BRIGHT ADJUSTMENT

**Purpose:** To get proper brightness.

**Symptom of Misadjustment:** Proper brightness cannot be obtained by adjusting the Bright Control.

Test Point	Adjustment Point	Input
Screen	VR601	Gray Scale pattern
Equipment		Spec.
Pattern Generator		See below
<b>Figure</b>		
		

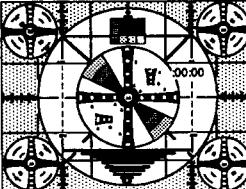
**Reference Notes:** VR601 --- CRT PCB

1. Operate the unit more than 20 minutes.
2. Input the 8-step Gray Scale pattern.
3. Adjust VR601 so that the bar is just visible. (See above figure)

## 14. FOCUS ADJUSTMENT

**Purpose:** To get correct focus.

**Symptom of Misadjustment:** Blurred image is shown on the display.

Test Point	Adjustment Point	Input
Screen	Focus-VR (FBT)	Monoscopic Pattern
Equipment		Spec.
Monoscope		See below
<b>Figure</b>		
		

**Reference Note:** Focus-VR (FBT) --- MAIN PCB

1. Operate the unit more than 20 minutes.
2. Input the Monoscopic Pattern.
3. Adjust Focus-VR (FBT) to obtain a clear picture.

## SCHEMATIC DIAGRAMS / PCB'S AND TEST POINTS

### STANDARD NOTES

#### Warning

Critical components having special safety characteristics are identified with a  $\Delta$  by the Ref. No. in the parts list and enclosed within a broken line \* (where several critical components are grouped in one area) along with the safety symbol  $\Delta$  on the schematics or exploded views.

Use of substitute replacement parts which do not have the same specified safety characteristics may create shock, fire, or other hazards.

Under no circumstances should the original design be modified or altered without written permission from Funai Electric Company. Funai assumes no liability, express or implied, arising out of any unauthorized modification of design. Servicer assumes all liability.

#### Notes:

- ① Do not use the part number shown on these drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since these drawings were prepared.
- ② All resistance values are indicated in ohms ( $K=10^3$ ,  $M=10^6$ ).
- ③ Resistor wattages are 1/5W or 1/6W unless otherwise specified.
- ④ All capacitance values are indicated in  $\mu F$  ( $P=10^{-6} \mu F$ ).

#### Note of Capacitors:

(M) --- Mylar Cap. (SC) --- Semiconductor Cap. (TF) --- Stacked Metallized Film Cap.

#### Temperature Characteristics of Capacitors are noted with the following:

(YB) ---  $\pm 10\%$  (SR) ---  $\pm 15\%$  (NP0) ---  $0\pm 60 \text{ ppm}/^\circ\text{C}$  (SL) ---  $+350\text{--}1000 \text{ ppm}/^\circ\text{C}$

#### Tolerance of Capacitors are noted with the following:

(K) ---  $\pm 10\%$  (Z) ---  $+80\text{--}20\%$

#### Note of Resistor:

(F) --- Fuse Res.

## VOLTAGE CHART

(Unit: Volt)

Pin No.	IC101	IC201	IC206
1	5.7	4.6	2.8
2	4.7	3.5	4.3
3	5.4	2.6	5.8
4	3.9	2.0	4.6
5	3.9	* 5.0~0.1	5.8
6	4.3	0	5.8
7	4.3	5.0	6.6
8	0	0	4.4
9	1.4	2.4	NC
10	4.8	2.5	4.4
11	6.0	2.5	0
12	3.8	5.0	0
13	8.4	5.0	0
14	8.4	5.0	0
15	3.8	5.0	3.1
16	4.4	5.0	5.0
17	11.7	0	2.9
18	0	NC	0.9
19	3.0	5.0	8.9
20	3.0	3.5	0.2
21		0	4.8
22		NC	0
23		0	0
24		0	2.2
25		0	9.0
26		4.1	3.6
27		5.0	0.5
28		3.0	0
29		3.0	4.2
30		0	5.2
31	—		3.0
32	—		0.6
33		4.9	0.4
34		0	6.1
35		5.0	6.1
36		4.5	5.8
37		0	2.5
38		5.0	2.6
39		0	2.5
40		0	3.9
41		0	4.8
42		5.0	6.8
43			2.6
44			3.3
45			3.6
46			6.3
47			8.9
48			0

Pin No.	IC202	IC203	IC204	IC205
1	5.0	6.0	0	11.0
2	2.5	5.9	13.0	4.9
3	2.5	6.9	27.4	NC
4	5.0	6.9	0.8	* 0.7~11.3
5	0	7.0	0.7	7.2
6	5.0	0	27.0	7.4
7	5.0	0	1.7	0
8	5.0	0		7.5
9			11.7	
10			11.7	
11			11.7	
12		4.6		
13		5.0		
14		5.0		
15		6.0		
16		11.7		

Pin No.	IC207	IC208	IC209	IC210
1	16.3	32.0	2.5	11.8
2	0	0	2.5	0
3	11.8		4.9	8.9
4			4.9	
5			1.7	
6			1.7	
7			2.5	
8			2.6	
9			3.3	
10			2.7	
11			2.7	
12			1.7	
13			0.2	
14			0	
15			2.2	
16			3.8	
17			2.3	
18			1.7	
19			4.9	
20			4.9	
21			2.5	
22			2.5	
23			0	
24			2.5	

\* Vol. Min~Max

**Input:** PAL Color Bar Signal (with 1KHz Audio Signal)

**Receiving Ch.:** E2 ch (48.25 MHz)

**Preset Mode:** Press Picture Select button on the remote control unit, then press the number "1" button.

Brightness--- Center

Color--- Center

Contrast--- Approx 70%

## EXPLODED VIEW

Jnt: Volt)

IC205

11.0

4.9

NC

\*0.7-11.3

7.2

7.4

0

7.5

15.5

IC210

11.8

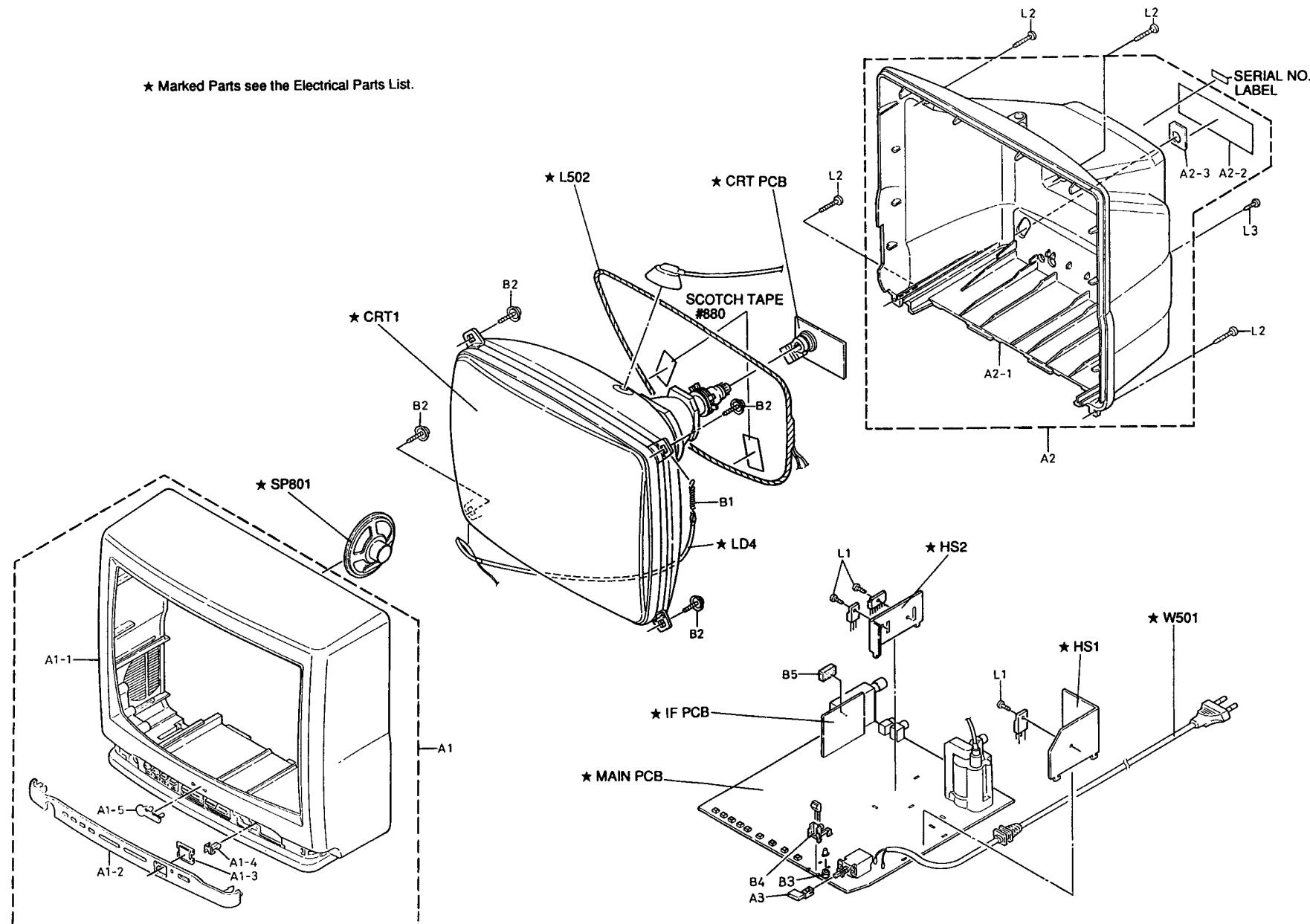
0

8.9

Signal)

Ste control unit,

★ Marked Parts see the Electrical Parts List.



## MECHANICAL PARTS LIST

**PRODUCT SAFETY NOTE:** Products marked with a  $\Delta$  have special characteristics important to safety. Before replacing any of these components, read carefully the product safety notice in this service manual. Don't degrade the safety of the product through improper servicing.

Ref. No.	Description	Part No.
A 1	FRONT CABINET ASS'Y	0EM300556
A 1-1	FRONT CABINET	0EM000113
A 1-2	CONTROL PANEL	0EM200264
A 1-3	SENSOR WINDOW	0EM401486
A 1-4	LED INDICATOR	0EM401470
A 1-5	BRAND BADGE	0EM400975
A 2	REAR CABINET ASS'Y	0EM300557
A 2-1	REAR CABINET	0EM000114
A 2-2 $\Delta$	RATING LABEL	0EM401495
A 2-3	JACK PLATE	0EM401488
A 3	(See Electrical Parts List)	
B 1	TENSION SPRING	26WH006
B 2	CRT MOUNTING SCREW	8A00083
B 3	(See Electrical Parts List)	
B 4	(See Electrical Parts List)	
B 5	(See Electrical Parts List)	
L 1	(See Electrical Parts List)	
L 2	SCREW P-TIGHT BND HEAD 4X18	GBMP4180
L 3	SCREW P-TIGHT BND HEAD 4X12	GBMP4120
<b>ACCESSORIES</b>		
$\Delta$	REMOTE CONTROL UNIT	UREMT20MM007
	DRY BATTERY UM-3(K) 2PCS PACK or	1813020
	DRY BATTERY UM3/RS6 2PCS PACK	579W099
	OWNER'S MANUAL	0EMN00641
	ROD ANTENNA	0EMN00542

\* Material certificate is required to attach.

## ELECTRICAL PARTS LIST

**PRODUCT SAFETY NOTE:** Products marked with a  $\Delta$  have special characteristics important to safety. Before replacing any of these components, read carefully the product safety notice in this service manual. Don't degrade the safety of the product through improper servicing.

NOTE: Parts that not assigned part number (-----) are not available.

Tolerance of Capacitors and Resistors are noted with the following symbols.

C..... $\pm 0.25\%$	F..... $\pm 1\%$	J..... $\pm 5\%$	M..... $\pm 20\%$	Z..... $+80-20\%$
D..... $\pm 0.5\%$	G..... $\pm 2\%$	K..... $\pm 10\%$	N..... $\pm 30\%$	

### MMA PCB ASSEMBLY

Ref. No.	Description	Part No.
	MMA PCB ASSEMBLY	0ESAD0337
	Consists of the following:	
$\Delta$	PCB (MAIN+CRT+IF)	BL7401F010B1
	MAIN PCB (MMA-A)	
	CRT PCB (MMA-B)	
	IF PCB (MMA-C)	

### MAIN PCB (MMA-A)

Ref. No.	Description	Part No.
	MAIN PCB (MMA-A)	
	Consists of the following:	
	<b>CAPACITORS</b>	
C 202	ELECTROLYTIC CAP. 10 $\mu$ F/50V M	126F1063
C 203	ELECTROLYTIC CAP. 4.7 $\mu$ F/50V M	126F4755
C 209	ELECTROLYTIC CAP. 4.7 $\mu$ F/50V M	126F4755
C 211	ELECTROLYTIC CAP. 4.7 $\mu$ F/50V M	126F4755
C 212	ELECTROLYTIC CAP. 220 $\mu$ F/6.3V M	126A2275
C 213	ELECTROLYTIC CAP. 1 $\mu$ F/50V M	126F1055
C 214	CHIP CERAMIC CAP. F Z 0.022 $\mu$ F/50V	CHE1JZB0F223
C 215	ELECTROLYTIC CAP. 10 $\mu$ F/50V M	126F1063
C 216	*MYLAR CAP. 0.18 $\mu$ F/50V K	22501845
C 217	ELECTROLYTIC CAP. 10 $\mu$ F/50V M	126F1063
C 218	ELECTROLYTIC CAP. 10 $\mu$ F/50V M	126F1063
C 219	ELECTROLYTIC CAP. 1 $\mu$ F/50V M	126F1055
C 220	CHIP CERAMIC CAP. SL J 120 $\mu$ F/50V	CHE1JJB5L121
C 221	ELECTROLYTIC CAP. 2.2 $\mu$ F/50V M	126F2255
C 224	CHIP CERAMIC CAP. CH J 24 $\mu$ F/50V	CHE1JJBCH240
C 225	CHIP CERAMIC CAP. CH J 24 $\mu$ F/50V	CHE1JJBCH240
C 229	CHIP CERAMIC CAP. F Z 0.01 $\mu$ F/50V	CHE1JZB0F103
C 230	ELECTROLYTIC CAP. 47 $\mu$ F/16V M	126C4765
C 232	CHIP CERAMIC CAP. SL J 100 $\mu$ F/50V	CHE1JJB5L101
C 233	ELECTROLYTIC CAP. 10 $\mu$ F/50V M	126F1063
C 234	ELECTROLYTIC CAP. 10 $\mu$ F/50V M	126F1063
C 235	ELECTROLYTIC CAP. 10 $\mu$ F/50V M	126F1063
C 236	CHIP CERAMIC CAP. F Z 0.01 $\mu$ F/50V	CHE1JZB0F103
C 237	CHIP CERAMIC CAP. SL J 47 $\mu$ F/50V	CHE1JJB5L470
C 238	MYLAR CAP. 0.001 $\mu$ F/50V K	22501025
C 239	MYLAR CAP. 0.022 $\mu$ F/50V K	22502225
C 240	MYLAR CAP. 0.1 $\mu$ F/50V K	22501045
C 241	CHIP CERAMIC CAP. B K 0.001 $\mu$ F/50V	CHE1JKB0B102

\* Mylar is a registered trademark of E. I. Du Pont de Nemours and Company.

Ref. No.	Description	Part No.
C 242	ELECTROLYTIC CAP. 100 $\mu$ F/35V M	126E107S
C 243	ELECTROLYTIC CAP. 22 $\mu$ F/35V M	126E226S
C 245	ELECTROLYTIC CAP. 2.2 $\mu$ F/50V M	126F225S
C 246	ELECTROLYTIC CAP. 10 $\mu$ F/50V M	126F106S
C 247	ELECTROLYTIC CAP. 470 $\mu$ F/25V M or ELECTROLYTIC CAP. 470 $\mu$ F/25V M or ELECTROLYTIC CAP. 470 $\mu$ F/25V M/W/F	C1EMZDDL471 C1EMZNTL471 626D477
C 249	METALIZED FILM CAP. 0.38 $\mu$ F/200V J or METALIZED FILM CAP. 0.39 $\mu$ F/200V J or METALIZED FILM CAP. 0.39 $\mu$ F/200V J	122180 C8P20KD00394
C 250	MYLAR CAP. 0.1 $\mu$ F/50V K	2250104S
C 251	ELECTROLYTIC CAP. 1 $\mu$ F/50V M	126F105S
C 252	CHIP CERAMIC CAP. B K 0.01 $\mu$ F/50V	CHE1JKB0B103
C 253	ELECTROLYTIC CAP. 2.2 $\mu$ F/50V M	126F225S
C 254	ELECTROLYTIC CAP. 10 $\mu$ F/50V M	126F106S
C 255	ELECTROLYTIC CAP. 10 $\mu$ F/50V M	126F106S
C 256	MYLAR CAP. 0.082 $\mu$ F/50V K	2250823S
C 257	ELECTROLYTIC CAP. 470 $\mu$ F/16V M or ELECTROLYTIC CAP. 470 $\mu$ F/16V M or ELECTROLYTIC CAP. 470 $\mu$ F/16V M or	C1EMZDDL471 C1EMZNTL471 626D477
C 259	ELECTROLYTIC CAP. 470 $\mu$ F/25V M or ELECTROLYTIC CAP. 470 $\mu$ F/25V M or ELECTROLYTIC CAP. 470 $\mu$ F/25V M or ELECTROLYTIC CAP. 470 $\mu$ F/25V M/W/F	C1EMZNTL471 626D477
C 260	ELECTROLYTIC CAP. 1 $\mu$ F/250V M (105°C)	C2AE01NC009
C 261	ELECTROLYTIC CAP. 330 $\mu$ F/35V M or ELECTROLYTIC CAP. 330 $\mu$ F/35V M or ELECTROLYTIC CAP. 330 $\mu$ F/35V M/W/F	C1EGM2ZDL331 C1EGM2ZNTL331 626E337
C 262	ELECTROLYTIC CAP. 1 $\mu$ F/100V or ELECTROLYTIC CAP. 1 $\mu$ F/100V	C2EAMADDL010 C2EAMANTL010
C 263	METALIZED FILM CAP. 0.0047 $\mu$ F/1.6KV or METALIZED FILM CAP. 0.0047 $\mu$ F/1.6KV J	1222183 1220496
C 264	METALIZED FILM CAP. 0.0027 $\mu$ F/1.6KV J or METALIZED FILM CAP. 0.0027 $\mu$ F/1.6KV J	1222279 1220493
C 265	ELECTROLYTIC CAP. 0.47 $\mu$ F/160V or ELECTROLYTIC CAP. 0.47 $\mu$ F/160V	C2E2MADDL474 C2E2MANTL474
C 268	CERAMIC CAP. B K 2200 $\mu$ F/500V	CCD2JKS08222
C 271	ELECTROLYTIC CAP. 47 $\mu$ F/160V M (105°C) or ELECTROLYTIC CAP. 47 $\mu$ F/160V M	CA2C470NC009 CE2CMZDEH470
C 273	ELECTROLYTIC CAP. 4.7 $\mu$ F/50V M	126F475S
C 276	ELECTROLYTIC CAP. 0.22 $\mu$ F/50V M	126F224S

Ref. No.	Description	Part No.
C 277	CHIP CERAMIC CAP. SL J 33pF/50V	CHE1JBSL330
C 278	ELECTROLYTIC CAP. 470 $\mu$ F/16V M or	CE1CMZD0L471
	ELECTROLYTIC CAP. 470 $\mu$ F/16V M or	CE1CMZNTL471
	ELECTROLYTIC CAP. 470 $\mu$ F/16V M	626C477
C 279	ELECTROLYTIC CAP. 1 $\mu$ F/50V M	126F105S
C 280	ELECTROLYTIC CAP. 1 $\mu$ F/50V M	126F105S
C 281	ELECTROLYTIC CAP. 1 $\mu$ F/50V M	126F105S
C 282	ELECTROLYTIC CAP. 1 $\mu$ F/50V M	126F105S
C 283	ELECTROLYTIC CAP. 1 $\mu$ F/50V M	126F105S
C 284	ELECTROLYTIC CAP. 4.7 $\mu$ F/50V M	126F475S
C 285	STACKED FILM CAP. 0.22 $\mu$ F/50V J or	125U224S
	STACKED FILM CAP. 0.22 $\mu$ F/50V J	125R224S
C 286	STACKED FILM CAP. 0.22 $\mu$ F/50V J or	125U224S
	STACKED FILM CAP. 0.22 $\mu$ F/50V J	125R224S
C 287	STACKED FILM CAP. 0.22 $\mu$ F/50V J or	125U224S
	STACKED FILM CAP. 0.22 $\mu$ F/50V J	125R224S
C 288	SEMICONDUCTOR CAP. SR K 0.047 $\mu$ F/25V	12Y2473S
C 289	CHIP CERAMIC CAP. B K 0.001 $\mu$ F/50V	CHE1JKB08102
C 290	CHIP CERAMIC CAP. F Z 0.022 $\mu$ F/50V	CHE1JZB0F223
C 291	ELECTROLYTIC CAP. 1 $\mu$ F/50V M	126F105S
C 292	CHIP CERAMIC CAP. F Z 0.01 $\mu$ F/50V	CHE1JZB0F103
C 293	ELECTROLYTIC CAP. 100 $\mu$ F/16V M	126C107S
C 294	FILM CAP. 0.47 $\mu$ F/50V J or	125U474S
	FILM CAP. 0.47 $\mu$ F/50V J	125R474S
C 295	STACKED FILM CAP. 0.15 $\mu$ F/50V J or	125U154S
	STACKED FILM CAP. 0.15 $\mu$ F/50V J	125R154S
C 296	ELECTROLYTIC CAP. 0.47 $\mu$ F/50V M	126F474S
C 297	CHIP CERAMIC CAP. B K 0.001 $\mu$ F/50V	CHE1JKB08102
C 298	TRIMMER CAP. VCT51F*** 30 $\mu$	CVC300UT1008
C 299	TRIMMER CAP. VCT51F*** 30 $\mu$	CVC300UT1008
C 300	CHIP CERAMIC CAP. B K 0.0022 $\mu$ F/50V	CHE1JKB08222
C 301	STACKED FILM CAP. 0.22 $\mu$ F/50V J or	125U224S
	STACKED FILM CAP. 0.22 $\mu$ F/50V J	125R224S
C 302	ELECTROLYTIC CAP. 22 $\mu$ F/50V M	126F226S
C 303	CHIP CERAMIC CAP. SL J 10 $\mu$ F/50V	CHE1JBSL100
C 304	CHIP CERAMIC CAP. SL J 82pF/50V	CHE1JBSL820
C 305	CHIP CERAMIC CAP. SL J 22pF/50V	CHE1JBSL220
C 306	CHIP CERAMIC CAP. F Z 0.01 $\mu$ F/50V	CHE1JZB0F103
C 307	CHIP CERAMIC CAP. SL J 75pF/50V	CHE1JBSL750
C 308	SEMICONDUCTOR CAP. F Z 0.1 $\mu$ F/25V	1220520S
C 309	CHIP CERAMIC CAP. SL J 27pF/50V	CHE1JBSL270
C 310	CHIP CERAMIC CAP. SL J 120pF/50V	CHE1JBSL121
C 311	ELECTROLYTIC CAP. 1 $\mu$ F/50V M	126F105S
C 312	CHIP CERAMIC CAP. B K 0.0056 $\mu$ F/50V	CHE1JKB08562
C 313	CHIP CERAMIC CAP. SL J 220pF/50V	CHE1JBSL221
C 314	CHIP CERAMIC CAP. SL J 220pF/50V	CHE1JBSL221
C 315	CHIP CERAMIC CAP. F Z 0.01 $\mu$ F/50V	CHE1JZB0F103
C 316	CHIP CERAMIC CAP. SL J 100pF/50V	CHE1JBSL101
C 317	SEMICONDUCTOR CAP. F Z 0.1 $\mu$ F/25V	1220520S
C 318	CHIP CERAMIC CAP. SL J 22pF/50V	CHE1JBSL220
C 319	CHIP CERAMIC CAP. SL J 75pF/50V	CHE1JBSL750
C 320	SEMICONDUCTOR CAP. F Z 0.1 $\mu$ F/25V	1220520S
C 321	CHIP CERAMIC CAP. SL J 120pF/50V	CHE1JBSL121
C 322	ELECTROLYTIC CAP. 47 $\mu$ F/16V M	126C476S
C 340	CERAMIC CAP. B K 470pF/500V	CCD2JKS471
C 341	CERAMIC CAP. B K 470pF/500V	1283471S
C 342	CERAMIC CAP. B K 470pF/500V	1283471S
C 343	ELECTROLYTIC CAP. 100 $\mu$ F/160V M(105°C) or ELECTROLYTIC CAP. 100 $\mu$ F/160V M(105°C)	CA2C101NC009
	CE2CMZDEH101	

Ref. No.	Description	Part No.
C 344	ELECTROLYTIC CAP. 1000 $\mu$ F/25V M or	CE1EMZD0L102
	ELECTROLYTIC CAP. 1000 $\mu$ F/25V M or	CE1EMZNTL102
	ELECTROLYTIC CAP. 1000 $\mu$ F/25V M/W/F	626D106
C 345	ELECTROLYTIC CAP. 47 $\mu$ F/16V M	126C476S
C 346	ELECTROLYTIC CAP. 2200 $\mu$ F/25V M	CE1EMZNTL222
C 347	ELECTROLYTIC CAP. 470 $\mu$ F/16V M or	CE1CMZD0L471
	ELECTROLYTIC CAP. 470 $\mu$ F/16V M or	CE1CMZNTL471
	ELECTROLYTIC CAP. 2.2 $\mu$ F/50V M	626C477
C 348	ELECTROLYTIC CAP. 470 $\mu$ F/16V M or	CE1CMZD0L471
C 363	ELECTROLYTIC CAP. 470 $\mu$ F/16V M or	CE1CMZNTL471
	ELECTROLYTIC CAP. 470 $\mu$ F/16V M	626C477
C 364	ELECTROLYTIC CAP. 470 $\mu$ F/16V M	626C477
C 365	MYLAR CAP. 0.1 $\mu$ F/50V K	2250104S
	CHIP CERAMIC CAP. F Z 0.022 $\mu$ F/50V	CHE1JZB0F223
C 366	MYLAR CAP. 0.0022 $\mu$ F/50V K	2250222S
C 368	CHIP CERAMIC CAP. B K 0.001 $\mu$ F/50V	CHE1JKB0B102
C 370	MYLAR CAP. 0.1 $\mu$ F/50V K	2250104S
C 372	CERAMIC CAP. CH D 10 $\mu$ F/50V	12CH100S
C 375	ELECTROLYTIC CAP. 47 $\mu$ F/16V M	126C476S
C 376	CERAMIC CAP. 1000pF/1KV or	CCD3AKP0E102
	CERAMIC CAP. 1000pF/1KV	6220574
C 377	CERAMIC CAP. CH J 47 $\mu$ F/50V	12CH470S
C 378	ELECTROLYTIC CAP. 1000 $\mu$ F/16V M W/F or	CE1CMZD0L102
	ELECTROLYTIC CAP. 1000 $\mu$ F/16V M or	CE1CMZNTL102
	ELECTROLYTIC CAP. 1000 $\mu$ F/16V M/W/F	626C108
C 379	ELECTROLYTIC CAP. 470 $\mu$ F/16V M or	CE1CMZD0L471
	ELECTROLYTIC CAP. 470 $\mu$ F/16V M or	CE1CMZNTL471
	ELECTROLYTIC CAP. 470 $\mu$ F/16V M	626C477
C 501 $\Delta$	CERAMIC CAP./SAFETY E M	CGC2HMP0E222
	2200 $\mu$ F/AC125V or	
	CERAMIC CAP./SAFETY 0.0022 $\mu$ F	1220621
C 502 $\Delta$	CERAMIC CAP./SAFETY E M	CGC2HMP0E222
	2200 $\mu$ F/AC125V or	
C 503 $\Delta$	CERAMIC CAP./SAFETY E M	CGC2HMP0E222
	2200 $\mu$ F/AC125V or	
C 504 $\Delta$	CERAMIC CAP./SAFETY E M	CGC2HMP0E222
	2200 $\mu$ F/AC125V or	
C 505 $\Delta$	CERAMIC CAP./SAFETY 0.0022 $\mu$ F	1220621
	METALIZED FILM CAP. 0.1 $\mu$ F/250V or	1220971
	METALIZED FILM CAP. 0.1 $\mu$ F/250V or	122Z181
	LINE ACROSS CAP. 0.1 $\mu$ F/250V	6222631
C 506	ELECTROLYTIC CAP.	CA2H151NC013
	150 $\mu$ F/400V(LQ TYPE)	
C 507	MYLAR CAP. 0.039 $\mu$ F/50V K	2250393S
C 508	CERAMIC CAP. 680pF/2KV or	CCD3AKP0B681
	CERAMIC CAP. 680pF/2KV	6220584
C 509	MYLAR CAP. 0.022 $\mu$ F/50V K	2250223S
C 510	MYLAR CAP. 0.022 $\mu$ F/50V K	2250223S
C 512 $\Delta$	CERAMIC CAP. 2200pF/400V(4KV) or	CCN2HMP0E222
	122Z011	
C 513	CERAMIC CAP. 2200pF/1KV or	CCD3AKP0B222
	CERAMIC CAP. 2200pF/1KV	6220576
C 515	ELECTROLYTIC CAP. 330 $\mu$ F/25V M or	CE1EMZD0L331
	ELECTROLYTIC CAP. 330 $\mu$ F/25V M or	CE1EMZNTL331
C 516	ELECTROLYTIC CAP. 330 $\mu$ F/25V M/W/F	626D337
C 517	CERAMIC CAP. 2200pF/1KV or	CCD3AKP0B222
	CERAMIC CAP. 2200pF/1KV	6220576

Ref. No.	Description	Part No.
CONNECTORS		
CN 201	STRAIGHT PIN HEADER	1740764
CN 202	PIN HEADER 5P (for D.Y) or	1730812
	PIN HEADER 5P (for D.Y)	1780168
CN 203	WIRE HOLDER 3P or	XW01D03NF001
	WIRE HOLDER 3P	XW01B03NF001
CN 204	WIRE HOLDER 6P or	XW01B06NF001
	WIRE HOLDER 6P	XW01B06NF001
CN 501	PIN HEADER 2P (for D.G COIL) or	1780276
	PIN HEADER 2P (for D.G COIL)	1780165
DIODES		
D 202	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 204	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 207	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 211	ZENER DIODE MTZ7.5B-T77 or	MTZ7.5BT
	ZENER DIODE GZ7.5V-BT or	QDTY00GZS7R5
D 212	ZENER DIODE MTZ7.5B-T77 or	MTZ7.5BT
	ZENER DIODE GZ7.5V-BT or	QDTY00GZS7R5
D 213	ZENER DIODE UZ-7.5BSA	QDTA0UZ7R5BS
	SWITCHING DIODE 1SS133 or	1SS133T
D 214	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 215	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 216	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 217	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 218	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 221	LED SLR-55V3CF(RED) or	140123
	LED KLR-13L	NPQZ0KLR133L
D 222	ZENER DIODE MTZ5.1C or	MTZ5.1CT
	ZENER DIODE GZ55.1Z-BT or	QDTZ00GZS5R1
	ZENER DIODE UZ-5.1BSB	QDTB0UZ5R1BS
D 227	RECTIFIER DIODE ERA15-02KFRB	QDN20ERA1502
D 228	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 229	DIODE ERB12-02L3	AERB1202L300
D 230	FAST RECOVERY DIODE ERB44-04L3	ODD020ERB4404
D 231	DIODE 1SS130	1SS130T
D 232	ZENER DIODE MTZ18BT or	MTZ18BT
	ZENER DIODE GZS18Y-BT or	QDTY00GZS18
C 509	ZENER DIODE UZ-188SB	QDTB0UZ188S
C 510	ZENER DIODE UZ-188SB	QDTB0UZ188S
C 512 $\Delta$	ZENER DIODE MTZ12BT or	MTZ12BT
	ZENER DIODE GZS12Y-BT or	QDTY00GZS12
	ZENER DIODE UZ-12BSA	QDTA0UZ12BS
C 513	ZENER DIODE MTZ5.6B or	MTZ5.6BT
	ZENER DIODE GZS5.6Y-BT or	QDTY00GZS5R6
C 515	ZENER DIODE UZ-5.6BSA	QDTA0UZ5R6BS
C 516	FAST RECOVERY DIODE ERD38-06L	AERD3806L000
C 517	RECTIFIER DIODE ERA22-02KFRB	QDS20ERA2202
	FAST RECOVERY DIODE ERB44-02L3	ODC2ERB4402L
D 242	RECTIFIER DIODE ERA22-02KFRB	QDS20ERA2202
D 243	FAST RECOVERY DIODE ERB44-02L3	ODC2ERB4402L
D 244	RECTIFIER DIODE R2M LF-B1 or	ODDZ0000R2M
D 245	RECTIFIER DIODE R2M LF-B1 or	AE0B0150000
	ZENER DIODE EQB01-150	AEOB0150000

Ref. No.	Description	Part No.
D 248	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 249	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 251	ZENER DIODE MTZ6.8B or	MTZ6.8BT
	ZENER DIODE GZS6.8Y-BT or	QDTY00GZS6R8
	ZENER DIODE UZ-6.8BSA	QDTA0UZ6R8BS
D 252	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 254	ZENER DIODE MTZ8.2B or	MTZ8.2BT
	ZENER DIODE GZS8.2Y-BT or	QDTY00GZS8R2
	ZENER DIODE UZ-8.2BSA	QDTA0UZ8R8BS
D 501	RECTIFIER DIODE ERC04-10L3	ODD20ERC0410
D 502	RECTIFIER DIODE ERC04-10L3	ODD20ERC0410
D 503	RECTIFIER DIODE ERC04-10L3	ODD20ERC0410
D 504	RECTIFIER DIODE ERC04-10L3	ODD20ERC0410
D 505	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 506	FAST RECOVERY DIODE ERB44-02L3	ODC2ERB4402L
D 507	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 509	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 510	ZENER DIODE MTZ15B-T77 or	MTZ15BT
	ZENER DIODE GZS15Y-BT or	QDTA0UZ15BS
	ZENER DIODE UZ-15BSA	QDTA0UZ15BS
D 511	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
ICS		
IC 201	IC3MICON TMP47C434N-R214	QSMQAOZTS015
IC 202	IC TC89101P	GTC89101P***
IC 203	IC TC4053BP or	140W168
	IC BU4053B	14LF166
IC 204	IC LA7830	14LN163
IC 205	IC AN5265	14LN160
IC 206	IC CA1213BS	QSBLA0SSN019
IC 207	VOLTAGE REGULATOR IC NUM78M12FA or	14LN242
	IC AN78M12 or	AN78M12
	IC 78M12 or	UPC78M12HF
	IC 78M12	L78M12
IC 208	IC L5631	L5631
IC 209	IC CA1214P	QSBLA0SSN011
IC 210	IC:VOLTAGE REGULATOR AN78M09 or	AN78M09
	IC 78M09	L78M09
COILS		

Ref. No.	Description	Part No.
L 215	MICRO INDUCTOR 15 $\mu$ H-K-AXT or	2165150T
	MICRO INDUCTOR 15 $\mu$ H-K-AXT	2162150T
L 216	CASING COIL (BELL) or	LFA07V0MM003
	CASING COIL (BELL)	LFA07V0TK003
L 217	MICRO INDUCTOR 15 $\mu$ H-K-AXT or	2165150T
	MICRO INDUCTOR 15 $\mu$ H-K-AXT	2162150T
L 218	POT COIL 47 $\mu$ H K	LLB00e+DMM001
L 501 $\Delta$	LINE FILTER 2.5mH or	LLBG00ZBW007
	LINE FILTER 2.5mH or	LLBG00ZMS008
	LINE FILTER 2.5mH	1812745

### TRANSISTORS

Q 204	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 205	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 206	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 207	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 208	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 209	TRANSISTOR 2SA1318T or	2SA1318T
	TRANSISTOR 2SA1318U or	2SA1318U
	TRANSISTOR KTA1266GR TO-92 or	NQS40KTA1266
	TRANSISTOR KTA1267GR	NQS10KTA1267
Q 210	TRANSISTOR 2SA1318T or	2SA1318T
	TRANSISTOR 2SA1318U or	2SA1318U
	TRANSISTOR KTA1266GR TO-92 or	NQS40KTA1266
	TRANSISTOR KTA1267GR	NQS10KTA1267
Q 211	TRANSISTOR 2SA1318T or	2SA1318T
	TRANSISTOR 2SA1318U or	2SA1318U
	TRANSISTOR KTA1266GR TO-92 or	NQS40KTA1266
	TRANSISTOR KTA1267GR	NQS10KTA1267
Q 213	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 214	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 215	TRANSISTOR 2SA1318T or	2SA1318T
	TRANSISTOR 2SA1318U or	2SA1318U
	TRANSISTOR KTA1266GR TO-92 or	NQS40KTA1266
	TRANSISTOR KTA1267GR	NQS10KTA1267
Q 216	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 217	TRANSISTOR 2SC331(T) or	QSC331TNPA

Ref. No.	Description	Part No.
O 218	TRANSISTOR 2SC331(U) or	QSC331TNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 219	TRANSISTOR 2SC331(U) or	QSC331TNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 220	TRANSISTOR 2SC227(D) or	2SC227D
	TRANSISTOR 2SC227(E) or	2SC227E
Q 221	TRANSISTOR 2SD2331 LS	QQPZ02SD2331
	TRANSISTOR 2SA1318T or	2SA1318T
	TRANSISTOR 2SA1318U or	2SA1318U
	TRANSISTOR KTA1266GR TO-92 or	NQS40KTA1266
	TRANSISTOR KTA1267GR	NQS10KTA1267
Q 222	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 223	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 224	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 225	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 227	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 228	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 229	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 233	TRANSISTER 2SB1274(R) or	Q2SB1274R000
	TRANSISTER 2SB1274(S) or	Q2SB1274S000
Q 234	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 235	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 236	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 237	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 238	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 239	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 240	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 501	TRANSISTOR 2SD1710CA	OR6Z02SD1710
Q 502	TRANSISTOR 2SC2907	QOPZ02SC3807
Q 504	TRANSISTOR 2S8696(F) or	QQS002S8696
	TRANSISTOR 2S8696(G) or	QQS002S8696
O 505 $\Delta$	PHOTO COUPLER PC111LYS	OPESOPC111LY
O 506	FET 2SK212E	2SK212E
O 507	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199

Ref. No.	Description	Part No.
Q 239	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 240	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 501	TRANSISTOR 2SD1710CA	OR6Z02SD1710
Q 502	TRANSISTOR 2SC2907	QOPZ02SC3807
Q 504	TRANSISTOR 2S8696(F) or	QQS002S8696
	TRANSISTOR 2S8696(G) or	QQS002S8696
O 505	PHOTO COUPLER PC111LYS	OPESOPC111LY
O 506	FET 2SK212E	2SK212E
O 507	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199

Ref. No.	Description	Part No.
R 253	CHIP RES. 1/10W 1K $\Omega$	RRXAJBBZ0102
R 254	CHIP RES. 1/10W 1.5K $\Omega$	RRXAJBBZ0152
R 260	CARBON RES. 1.6W J 330 $\Omega$ or	132A331T
	CARBON RES. 1.5W J 330 $\Omega$	1324531T
R 262	CHIP RES. 1/10W 10K $\Omega$	RRXAJBBZ0103
R 263	CHIP RES. 1/10W 10K $\Omega$	RRXAJBBZ0103
R 264	CHIP RES. 1/10W J 33K $\Omega$	RRXAJBBZ0333
R 265	CHIP RES. 1/10W 2.7K $\Omega$	RRXAJBBZ0272
R 266	CHIP RES. 1/10W J 12K $\Omega$	RRXAJBBZ0123
R 267	CHIP RES. 1/10W 5.6K $\Omega$	RRXAJBBZ0562
R 268	CHIP RES. 1/10W J 1.8K $\Omega$	RRXAJBBZ0182
R 269	CHIP RES. 1/10W J 2.7K $\Omega$	RRXAJBBZ0272
R 270	CHIP RES. 1/10W J 18K $\Omega$	RRXAJBBZ0183
R 271	CHIP RES. 1/10W J 22K $\Omega$	RRXAJBBZ0223
R 272	CHIP RES. 1/10W J 8.2K $\Omega$	RRXAJBBZ0682
R 273	CHIP RES. 1/10W J 68K $\Omega$	RRXAJBBZ0683
R 274	CHIP RES. 1/10W J 3.9K $\Omega$	RRXAJBBZ0392
R 275	CHIP RES. 1/10W J 10K $\Omega$	RRXAJBBZ0103
R 276	CHIP RES. 1/10W J 10K $\Omega$	RRXAJBBZ0103
R 277	CHIP RES. 1/10W J 1K $\Omega$	RRXAJBBZ0102
R 278	CARBON RES. 1.6W J 10K $\Omega$ or	132A103T
	CARBON RES. 1.5W J 10K $\Omega$	1324103T
R 279	CHIP RES. 1/10W J 4.7K $\Omega$	RRXAJBBZ0473
R 280	CHIP RES. 1/10W J 10K $\Omega$	RRXAJBBZ0103
R 281	CHIP RES. 1/10W J 82K $\Omega$	RRXAJBBZ0823
R 282	CHIP RES. 1/10W J 56K $\Omega$	RRXAJBBZ0663
R 283	CHIP RES. 1/10W J 33K $\Omega$	RRXAJBBZ0333
R 284	CHIP RES. 1/10W J 470 $\Omega$	RRXAJBBZ0471
R 285	CHIP RES. 1/10W J 1K $\Omega$	RRXAJBBZ0102
R 286	CHIP RES. 1/10W J 15K $\Omega$	RRXAJBBZ0153
R 287	CHIP RES. 1/10W J 3.9K $\Omega$	RRXAJBBZ0392
R 288	CHIP RES. 1/10W J 12K $\Omega$	RRXAJBBZ0123
R 289	CHIP RES. 1/10W J 12K $\Omega$	RRXAJBBZ0123
R 290	CHIP RES. 1/10W J 12K $\Omega$	RRXAJBBZ0123
R 291	CARBON RES. 1/4W J 1K $\Omega$ or	1345108S
	CARBON RES. 1/4W J 10K $\Omega$	RCX4JATZ0109
R 292	CARBON RES. 1/4W J 2.2K $\Omega$ or	1345228S
	CARBON RES. 1/4W J 2.2K $\Omega$	RCX4JATZ0229
R 296	CARBON RES. 1/4W J 1K $\Omega$ or	1345102S
	CARBON RES. 1/4W J 1K $\Omega$	RCX4JATZ0102
R 298	CHIP RES. 1/10W J 4.7K $\Omega$	RRXAJBBZ0472
R 301	CHIP RES. 1/10W J 10K $\Omega$	RRXAJBBZ0103
R 302	CHIP RES. 1/10W J 18K $\Omega$	RRXAJBBZ0183
R 303	CHIP RES. 1/10W J 10K $\Omega$	RRXAJBBZ0103
R 304	CHIP RES. 1/10W J 560 $\Omega$	RRXAJBBZ0561
R 305	CHIP RES. 1/10W J 4.7 $\Omega$	RRXAJBBZ0471
R 306	CARBON RES. 1/4W J 220 $\Omega$ or	1345221S
	CARBON RES. 1/4W J 220 $\Omega$	RCX4JATZ0221
R 307	FUSE RES. 2.20J 1W or	RF01229KA004
	FUSE RES. 1W J 2.2 $\Omega$	5363228
R 308	FUSE RES. 2.20J 1W or	RF01229KA004
	FUSE RES. 1W J 2.2 $\Omega$	5363229
R 310	CARBON RES. 1.6W J 5.6K $\Omega$ or	132A562T
	CARBON RES. 1.5W J 5.6K $\Omega$	1324562T
R 311	CARBON RES. 1.6W J 5.6K $\Omega$ or	132A562T
	CARBON RES. 1.5W J 5.6K $\Omega$	1324562T
R 314	CHIP RES. 1/10W J 820 $\Omega$	RRXAJBBZ0821
R 315	CARBON RES. 1/4W J 2.2K $\Omega$ or	1345222S
	CARBON RES. 1/4W J 2.2K $\Omega$	RCX4JATZ0222

Ref. No.	Description	Part No.
R 316	CEMENT RES. 5W K3.3KΩ or	RW05332PG003
	CEMENT RES. 3.3KΩ 5W or	RW05332UB001
	CEMENT RES. 5W K3.3KΩ	RW05332KA006
R 317	CHIP RES. 1/10W J 82KΩ	RRXAJBBZ0823
R 318	CARBON RES. 1/6W J 12KΩ or	132A123T
	CARBON RES. 1/5W J 12KΩ	132A123T
R 319	CHIP RES. 1/10W J 12KΩ	RRXAJBBZ0123
R 320	CHIP RES. 1/10W J 100KΩ	RRXAJBBZ0104
R 321	CARBON RES. 1/6W J 220KΩ or	132A224T
	CARBON RES. 1/5W J 220KΩ	132A224T
R 322	CHIP RES. 1/10W J 1.8KΩ	RRXAJBBZ0182
R 323	CHIP RES. 1/10W J 27KΩ	RRXAJBBZ0273
R 324	CHIP RES. 1/10W J 10KΩ	RRXAJBBZ0103
R 325	CHIP RES. 1/10W J 1.5KΩ	RRXAJBBZ0152
R 326	CHIP RES. 1/10W J 1.8KΩ	RRXAJBBZ0182
R 327	CHIP RES. 1/10W J 100KΩ	RRXAJBBZ0104
R 328	CHIP RES. 1/10W J 100KΩ	RRXAJBBZ0104
R 329	CHIP RES. 1/10W J 6.8KΩ	RRXAJBBZ0682
R 330	CHIP RES. 1/10W J 4.7KΩ	RRXAJBBZ0472
R 331	CHIP RES. 1/10W J 10KΩ	RRXAJBBZ0103
R 332	CHIP RES. 1/10W J 47KΩ	RRXAJBBZ0473
R 333	CHIP RES. 1/10W J 680KΩ	RRXAJBBZ0684
R 335	CHIP RES. 1/10W J 270KΩ	RRXAJBBZ0271
R 336	CHIP RES. 1/10W J 180KΩ	RRXAJBBZ0181
R 337	CHIP RES. 1/10W J 4.7KΩ	RRXAJBBZ0472
R 338	CHIP RES. 1/10W J 470KΩ	RRXAJBBZ0471
R 339	CHIP RES. 1/10W J 330KΩ	RRXAJBBZ0334
R 340	CHIP RES. 1/10W J 330KΩ	RRXAJBBZ0331
R 341	CHIP RES. 1/10W J 5.6KΩ	RRXAJBBZ0562
R 346	METALIZED FILM RES. 1/5W F 27KΩ	13C2702
R 347	CHIP RES. 1/10W J 4.7KΩ	RRXAJBBZ0472
R 348	CHIP RES. 1/10W J 10KΩ	RRXAJBBZ0103
R 349	CHIP RES. 1/10W J 27KΩ	RRXAJBBZ0273
R 350	CHIP RES. 1/10W J 3.3MΩ	RRXAJBBZ0335
R 351	CHIP RES. 1/10W J 380Ω	RRXAJBBZ0391
R 355	CHIP RES. 1/10W J 47KΩ	RRXAJBBZ0473
R 356	CARBON RES. 1/6W J 470Ω or	132A471T
	CARBON RES. 1/5W J 470Ω	132A471T
R 357	CHIP RES. 1/10W J 380Ω	RRXAJBBZ0391
R 358	CHIP RES. 1/10W J 820Ω	RRXAJBBZ0821
R 359	CHIP RES. 1/10W J 1KΩ	RRXAJBBZ0102
R 360	CARBON RES. 1/6W J 270Ω or	132A271T
	CARBON RES. 1/5W J 270Ω	132A271T
R 361	CHIP RES. 1/10W J 390Ω	RRXAJBBZ0391
R 362	CHIP RES. 1/10W J 4.7KΩ	RRXAJBBZ0472
R 363	CHIP RES. 1/10W J 10KΩ	RRXAJBBZ0103
R 364	CHIP RES. 1/10W J 390Ω	RRXAJBBZ0391
R 365	CHIP RES. 1/10W J 270Ω	RRXAJBBZ0271
R 366	CHIP RES. 1/10W J 470Ω	RRXAJBBZ0471
R 367	CHIP RES. 1/10W J 2.2KΩ	RRXAJBBZ0222
R 368	CHIP RES. 1/10W J 10KΩ	RRXAJBBZ0103
R 369	CHIP RES. 1/10W J 22KΩ	RRXAJBBZ0223
R 396	CARBON RES. 1/6W J 150KΩ or	132A154T
	CARBON RES. 1/5W J 150KΩ	132A154T
R 397	CARBON RES. 1/6W J 10KΩ or	132A103T
	CARBON RES. 1/5W J 10KΩ	132A103T
R 398	CARBON RES. 1/6W J 33KΩ or	132A333T
	CARBON RES. 1/5W J 33KΩ	132A333T
R 399	CARBON RES. 1/4W J 1.5KΩ or	1345152S
	CARBON RES. 1/4W J 1.5KΩ	1345152S

Ref. No.	Description	Part No.
R 400	CARBON RES. 1/6W J 22KΩ or	132A223T
	CARBON RES. 1/5W J 22KΩ	132A223T
R 401	CARBON RES. 1/6W J 27KΩ or	132A273T
	CARBON RES. 1/5W J 27KΩ	132A273T
R 402	CARBON RES. 1/6W J 10KΩ or	132A103T
	CARBON RES. 1/5W J 10KΩ	132A103T
R 403	CARBON RES. 1/6W J 5.6KΩ or	132A562T
	CARBON RES. 1/5W J 5.6KΩ	132A562T
R 404	CARBON RES. 1/6W J 10KΩ or	132A104T
	CARBON RES. 1/5W J 10KΩ	132A104T
R 405	CARBON RES. 1/6W J 12KΩ or	132A124T
	CARBON RES. 1/5W J 12KΩ	132A124T
R 406	CARBON RES. 1/6W J 47KΩ or	132A473T
	CARBON RES. 1/5W J 47KΩ	132A473T
R 407	CARBON RES. 1/6W J 22KΩ or	132A223T
	CARBON RES. 1/5W J 22KΩ	132A223T
R 408	METAL RES. 1W J 15KΩ or	RN01JZDZ0153
	METAL RES. 1W J 15KΩ	534A153
R 410	CARBON RES. 1/6W J 180Ω or	132A181T
	CARBON RES. 1/5W J 180Ω	132A181T
R 411	CHIP RES. 1/10W J 2.7KΩ	RRXAJBBZ0272
R 412	METAL RES. 2W J 27Ω or	RN02JZDZ0270
	METAL RES. 2W J 27Ω	534B270
R 413	CHIP RES. 1/10W J 68KΩ	RRXAJBBZ0683
R 414	CHIP RES. 1/10W J 27KΩ	RRXAJBBZ0273
R 415	CARBON RES. 1/6W J 10KΩ or	132A103T
	CARBON RES. 1/5W J 10KΩ	132A103T
R 416	CARBON RES. 1/6W J 3.3KΩ or	132A332T
	CARBON RES. 1/5W J 3.3KΩ	132A332T
R 417	CHIP RES. 1/10W J 100Ω	RRXAJBBZ0101
R 418	FUSE RES. 1/2W J 2.2Ω or	5367229
	FUSE RES. 1/2W J 2.2Ω	5367229
R 430	CHIP RES. 1/10W J 2.2KΩ	RRXAJBBZ0222
R 431	CHIP RES. 1/10W J 10KΩ	RRXAJBBZ0103
R 433	CHIP RES. 1/10W J 180Ω	RRXAJBBZ0181
R 434	CHIP RES. 1/10W J 3.3KΩ	RRXAJBBZ0332
R 435	CHIP RES. 1/10W J 4.7KΩ	RRXAJBBZ0472
R 436	CHIP RES. 1/10W J 100KΩ	RRXAJBBZ0104
R 437	CHIP RES. 1/10W J 100KΩ	RRXAJBBZ0104
R 440	CHIP RES. 1/10W J 3.3KΩ	RRXAJBBZ0332
R 441	CHIP RES. 1/6W J 47Ω or	132A470T
	CARBON RES. 1/5W J 47Ω	132A470T
R 442	CARBON RES. 1/6W J 33KΩ or	132A333T
	CARBON RES. 1/5W J 33KΩ	132A333T
R 443	CARBON RES. 1/6W J 33KΩ or	132A333T
	CARBON RES. 1/5W J 33KΩ	132A333T
R 446	CARBON RES. 1/6W J 10KΩ or	132A103T
	CARBON RES. 1/5W J 10KΩ	132A103T
R 447	CARBON RES. 1/6W J 10KΩ or	132A103T
	CARBON RES. 1/5W J 10KΩ	132A103T
R 501	CEMENT RES. 5W K 1.2Ω or	RW051R2PG001
	CEMENT RES. 5W K 1.2Ω	RW051R2UB001
R 502	CEMENT RES. 5W K 1.2Ω	RW051R2KA006
	CARBON RES. 1/4W J 120KΩ or	1345124S
	CARBON RES. 1/4W J 120KΩ	1345124S
R 503	CARBON RES. 1/4W J 120KΩ or	1345124S
	CARBON RES. 1/4W J 15KΩ or	1345159S
R 504	CARBON RES. 1/4W J 15KΩ or	1345159S
	CARBON RES. 1/4W J 15KΩ	1345159S

Ref. No.	Description	Part No.
R 505	CARBON RES. 1/4W J 220Ω or	1345221S
	CARBON RES. 1/4W J 220Ω	RCX4JATZ0221
R 506	CARBON RES. 1/4W J 1.5KΩ or	1345152S
	CARBON RES. 1/4W J 1.5KΩ	RCX4JATZ0152
R 507	METAL RES. 2W J 82Ω or	RN02JZDZ0820
	METAL RES. 2W J 82Ω	534B820
R 508	METAL RES. 3W J 68Ω or	RN03680KE003
	METAL RES. 3W J 68Ω	RN03680KA001
R 509	CARBON RES. 1/6W J 470Ω or	132A471T
	CARBON RES. 1/5W J 470Ω	132A471T
R 510	CARBON RES. 1/6W J 22KΩ or	132A223T
	CARBON RES. 1/5W J 22KΩ	132A223T
R 512	METAL RES. 2W J 0.68KΩ or	RN02JZDZ068A
	METAL RES. 2W J 0.68KΩ	534B68A
R 513	CARBON RES. 1/4W J 5.6KΩ or	1345562S
	CARBON RES. 1/4W J 5.6KΩ	RCX4JATZ0562
R 514	METAL RES. 3W J 33Ω or	RN03330KE003
	METAL RES. 3W J 33Ω	RN03330KA001
R 519	CARBON RES. 1/6W J 330Ω or	132A331T
	CARBON RES. 1/5W J 330Ω	132A331T
R 520	CARBON RES. 1/6W J 47KΩ or	132A473T
	CARBON RES. 1/5W J 47KΩ	132A473T
R 521	CARBON RES. 1/6W J 27KΩ or	132A273T
	CARBON RES. 1/5W J 27KΩ	132A273T
R 522	CARBON RES. 1/4W J 560KΩ or	1345564S
	CARBON RES. 1/4W J 560KΩ	RCX4JATZ0564
JW 202	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 203	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 204	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 205	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 206	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 207	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 208	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 210	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 211	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 213	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 214	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 215	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 216	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 217	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 218	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 220	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 221	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 222	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 223	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 224	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 226	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 227	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 228	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 230	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 232	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 233	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 234	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 240	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000

Ref. No.	Description	Part No.
JW 241	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 250	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
	<b>SWITCHES</b>	
SW 201	TAUT SWITCH SKHHBV or	SST0101AL013
SW 202	LIGHT TOUCH SWITCH EVOPAC07K	SST0101MS013
SW 203	TAUT SWITCH SKHHBV or	SST0101AL013
SW 204	LIGHT TOUCH SWITCH EVOPAC07K	SST0101MS013
SW 205	TAUT SWITCH SKHHBV or	SST0101MS013
SW 206	TAUT SWITCH SKHHBV or	SST0101AL013
SW 207	LIGHT TOUCH SWITCH EVOPAC07K	SST0101MS013
SW 208	TAUT SWITCH SKHHBV or	SST0101AL013
SW 209	LIGHT TOUCH SWITCH EVOPAC07K	SST0101MS013
SW 209	SLIDE SWITCH SSV-22-0300 or	SSS0202D001
	SLIDE SWITCH or	1621654
	SLIDE SWITCH or	SSS0202WM001
	SLIDE SWITCH	SSS0202H003
SW 501	PUSH SWITCH SPPW81-6.55-A2	SPP0AAZMS001
	<b>TRANSFORMERS</b>	
T 201	FLYBACK TRANS 154-064M [GOLD STAR] or	LTF00EPGS001
	FLYBACK TRANS FCK-14B025 [SAMSUNG]	LTF00EPSM002
T 202	H DRIVE TRANS TE-1410	1150325
T 501	POWER TRANS TS8045VA	LTT00EPMS011
	<b>VARIABLE RESISTORS</b>	
VR 202	POTENTIOMETER 50KΩ B	138J784
VR 203	POTENTIOMETER 500KΩ B	138J776
VR 204	POTENTIOMETER 500Ω B	138J776
VR 205	POTENTIOMETER 2KΩ B H	138J778
	<b>MISCELLANEOUS</b>	
A 3	POWER KNOB	0EM401485
B 3	LED TUBE	0EM401473
B 4	SENSOR HOLDER	0EM401471
B 5	CUSHION	0EM401374
DL 201	GLASS DELAY EFDEN645A61H or	1813554
	GLASS DELAY	1812056
F 501	FUSE 14.0AH 250V	PAGC20BAG402
FH 501	HOLDER FUSE FH-V-03078 or	XH01Z000K001
	HOLDER FUSE CNT41-0014	1780424
FH 502	HOLDER FUSE FH-V-03078 or	XH01Z000K001
	HOLDER FUSE CNT41-0014	1780424
HS 1	HEAT SINK PR (for Q501)	0EM300441
HS 2	HEAT SINK PS (for IC204/IC207)	0EM401145
IP 201	IC PROTECTOR ICP-N10	579F0852
IP 202	IC PROTECTOR ICP-N20	579F0872
J 201	EARPHONE JACK HS1403-01-010	JYSL030HD002
J 202	RCA JACK JPJ2030-01-030	JXNL010HD001
J 203	BNC JACK or	JXNL010RA002
	BNC JACK	JXNL010HD002
L 1	SCREW B-TIGHT BIND HEAD 3X8	GBMB3080
LD 2	RIBBON WIRE 3P	WX1L7401-003
LD 3	RIBBON WIRE 6P	WX1L7401-004
PS 501	POSISTOR ZP853L200C	5790117

Ref. No.	Description	Part No.
TP 1	TEST PIN or	1700093
	TEST PIN SJT-743-3	1740354
TP 2	TEST PIN or	1700093
	TEST PIN SJT-743-3	1740354
TP 3	TEST PIN or	1700093
	TEST PIN SJT-743-3	1740354
TP 4	TEST PIN or	1700093
	TEST PIN SJT-743-3	1740354
TP 5	TEST PIN or	1700093
	TEST PIN SJT-743-3	1740354
TU 201	TUNER UNIT ENV-79838-F2	UTUNPSDMS001
U 201	REMOTE SENSOR UNIT CMXX920F-S	USESJRSSN001
W 501 $\Delta$	AC CORD LA-1398	WAE0192LW001
XT 201	CERALOCK 4.19MHz or	1812885
	CERAMIC RESONATOR KBR-4.19MHz	1813682
XT 202	SERAMIC RESONATOR CSB500F2	1812039
XT 203	CRYSTAL OSCILLATOR 4.43MHz	1811387
XT 204	CRYSTAL OSCILLATOR 3.579545KHz	1811291
	LEAD CLAMPER or	1790256
	LEAD CLAMPER	1790356

### CRT PCB (MMA-B)

Ref. No.	Description	Part No.
	CRT PCB (MMA-B)	
Consists of the following:		
CAPACITORS		
C 601 $\Delta$	CERAMIC CAP. 0.01 $\mu$ F/2KV or	CCD3DZP0E103
	CERAMIC CAP. 0.01 $\mu$ F/2KV	6220602
C 602	CHIP CERAMIC CAP. SLJ 270pF/50V	CHE1JBSL271
C 603	CHIP CERAMIC CAP. SLJ 270pF/50V	CHE1JBSL271
C 604	CHIP CERAMIC CAP. SLJ 330pF/50V	CHE1JBSL331
CONNECTORS		
CN 601	CRT SOCKET HPS171-01-020 or	1780080
	CRT SOCKET CVT308-1301	1780218
CN 602	CONNECTOR PIN 1P or	1700576
	CONNECTOR PIN 1P RT-01N-2.3A	1730688
CN 603	WIRE HOLDER 3P 51039-0300 or	XW01D03NF001
	WIRE HOLDER 3P 51039-0300	XW01B03NF001
CN 604	WIRE HOLDER 6P 51039-0600 or	XW01D06NF001
	WIRE HOLDER 6P 51039-0600	XW01B06NF001
TRANSISTORS		
Q 601	TRANSISTOR 2SC2280(D) or	2SC2280
	TRANSISTOR 2SC2280(E)	2SC228E
Q 602	TRANSISTOR 2SC2280(D) or	2SC2280
	TRANSISTOR 2SC2280(E)	2SC228E
Q 603	TRANSISTOR 2SC2280(D) or	2SC2280
	TRANSISTOR 2SC2280(E)	2SC228E
RESISTORS		
R 601	CARBON RES. 14W J 1.8K $\Omega$ or	RCX4JATZ0182
	CARBON RES. 14W J 1.8K $\Omega$	13451825
R 602	CARBON RES. 14W J 1.8K $\Omega$ or	RCX4JATZ0182
	CARBON RES. 14W J 1.8K $\Omega$	13451825
R 603	CARBON RES. 14W J 1.8K $\Omega$ or	RCX4JATZ0182
	CARBON RES. 14W J 1.8K $\Omega$	13451825
R 604	CARBON RES. 14W J 1.5K $\Omega$ or	RCX4JATZ0152
	CARBON RES. 14W J 1.5K $\Omega$	13451525
R 605	CARBON RES. 14W J 1.5K $\Omega$ or	RCX4JATZ0152
	CARBON RES. 14W J 1.5K $\Omega$	13451525

Ref. No.	Description	Part No.
R 606	CARBON RES. 14W J 1.5K $\Omega$ or	RCX4JATZ0152
	CARBON RES. 14W J 1.5K $\Omega$	13451525
R 607	CHIP RES. 1/10W J 2.7K $\Omega$	RRXAJBBZ0272
R 608	CHIP RES. 1/10W J 820 $\Omega$	RRXAJBBZ0821
R 609	CHIP RES. 1/10W J 220 $\Omega$	RRXAJBBZ0221
R 610	CHIP RES. 1/10W J 2.7K $\Omega$	RRXAJBBZ0272
R 611	CHIP RES. 1/10W J 1.5K $\Omega$	RRXAJBBZ0152
R 612	CHIP RES. 1/10W J 820 $\Omega$	RRXAJBBZ0821
R 613	CHIP RES. 1/10W J 220 $\Omega$	RRXAJBBZ0221
R 614	CHIP RES. 1/10W J 2.2K $\Omega$	RRXAJBBZ0222
R 615	CHIP RES. 1/10W J 820 $\Omega$	RRXAJBBZ0821
R 616	CHIP RES. 1/10W J 220 $\Omega$	RRXAJBBZ0221
R 617	METAL RES. 1W J 15K $\Omega$ or	RN01JZDZ0153
	METAL RES. 1W J 15K $\Omega$	534A153
R 618	METAL RES. 1W J 15K $\Omega$ or	RN01JZDZ0153
	METAL RES. 1W J 15K $\Omega$	534A153
R 619	METAL RES. 1W J 15K $\Omega$ or	RN01JZDZ0153
	METAL RES. 1W J 15K $\Omega$	534A153
R 620	CHIP RES. 1/10W J 2.2K $\Omega$	RRXAJBBZ0222
R 621	CHIP RES. 1/10W J 470 $\Omega$	RRXAJBBZ0471
R 622	CHIP RES. 1/10W J 2.2K $\Omega$	RRXAJBBZ0222
R 623	CHIP RES. 1/10W J 470 $\Omega$	RRXAJBBZ0471
R 624	CHIP RES. 1/10W J 2.2K $\Omega$	RRXAJBBZ0222
R 625	CHIP RES. 1/10W J 470 $\Omega$	RRXAJBBZ0471
R 626	CHIP RES. 1/10W J 270 $\Omega$	RRXAJBBZ0271
R 627	CHIP RES. 1/10W J 270 $\Omega$	RRXAJBBZ0271
R 628	CHIP RES. 1/10W J 270 $\Omega$	RRXAJBBZ0271
JW 601	CHIP RES. 1/10W J 0 $\Omega$	RRXAJBBZ0000
JW 602	CHIP RES. 1/10W J 0 $\Omega$	RRXAJBBZ0000
JW 603	CHIP RES. 1/10W J 0 $\Omega$	RRXAJBBZ0000
JW 604	CHIP RES. 1/10W J 0 $\Omega$	RRXAJBBZ0000
VARIABLE RESISTORS		
VR 601	POTENTIOMETER 50K $\Omega$ B	138JB20
VR 602	POTENTIOMETER 3K $\Omega$ B	138JB15
VR 603	POTENTIOMETER 3K $\Omega$ B	138JB15
VR 604	POTENTIOMETER 5K $\Omega$ B	138JB16
VR 605	POTENTIOMETER 5K $\Omega$ B	138JB16
VR 606	POTENTIOMETER 5K $\Omega$ B	138JB16

### IF PCB (MMA-C)

Ref. No.	Description	Part No.
	IF PCB (MMA-C)	
Consists of the following:		
CAPACITORS		
C 101	CHIP CERAMIC CAP. SLJ 22pF/50V	CHE1JBSL220
C 102	CHIP CERAMIC CAP. SLJ 10pF/50V	CHE1JBSL100
C 103	CHIP CERAMIC CAP. B K 0.01 $\mu$ F/50V	CHE1JKB08103
C 104	MYLAR CAP. 0.068 $\mu$ F/50V K	2250683S
C 105	CHIP CERAMIC CAP. B K 0.001 $\mu$ F/50V	CHE1JKB08102
C 106	ELECTROLYTIC CAP. 0.47 $\mu$ F/50V M	126F474S
C 107	ELECTROLYTIC CAP. 4.7 $\mu$ F/50V M	126F475S
C 108	CHIP CERAMIC CAP. F Z 0.01 $\mu$ F/50V	CHE1JZB0F103
C 109	CHIP CERAMIC CAP. F Z 0.01 $\mu$ F/50V	CHE1JZB0F103
C 110	CHIP CERAMIC CAP. F Z 0.01 $\mu$ F/50V	CHE1JZB0F103
C 111	CHIP CERAMIC CAP. F Z 0.01 $\mu$ F/50V	CHE1JZB0F103
C 112	CHIP CERAMIC CAP. F Z 0.01 $\mu$ F/50V	CHE1JZB0F103
C 113	CHIP CERAMIC CAP. F Z 0.01 $\mu$ F/50V	CHE1JZB0F103
C 114	CHIP CERAMIC CAP. F Z 0.01 $\mu$ F/50V	CHE1JZB0F103
C 115	CHIP CERAMIC CAP. F Z 0.01 $\mu$ F/50V	CHE1JZB0F103
C 116	CHIP RES. 1/10W J 560 $\Omega$	RRXAJBBZ0561
C 117	CHIP RES. 1/10W J 5.6K $\Omega$	RRXAJBBZ0562
C 118	CHIP RES. 1/10W J 33 $\Omega$	RRXAJBBZ0330
C 119	CHIP RES. 1/10W J 1.5K $\Omega$	RRXAJBBZ0152
C 120	CHIP RES. 1/10W J 180K $\Omega$	RRXAJBBZ0184
C 121	CHIP RES. 1/10W J 33 $\Omega$	RRXAJBBZ0331
C 122	CHIP RES. 1/10W J 560 $\Omega$	RRXAJBBZ0561
C 123	CHIP RES. 1/10W J 33 $\Omega$	RRXAJBBZ0330
C 124	CHIP RES. 1/10W J 100K $\Omega$	RRXAJBBZ0104
C 125	CHIP RES. 1/10W J 1.8K $\Omega$	RRXAJBBZ0182

Ref. No.	Description	Part No.
C 122	CHIP CERAMIC CAP. CH J 130pF/50V	CHE1JBCB131
C 124	CHIP CERAMIC CAP. SLJ 27pF/50V	CHE1JBSL270
C 125	CHIP CERAMIC CAP. SLJ 33pF/50V	CHE1JBSL330
C 126	CHIP CERAMIC CAP. SLJ 22pF/50V	CHE1JBSL220
C 127	CHIP CERAMIC CAP. SLJ 27pF/50V	CHE1JBSL270
C 128	ELECTROLYTIC CAP. 47 $\mu$ F/50V M	126F476S
C 129	CHIP CERAMIC CAP. F Z 0.01 $\mu$ F/50V	CHE1JZB0F103
C 130	CHIP CERAMIC CAP. F Z 0.01 $\mu$ F/50V	CHE1JZB0F103
CONNECTORS		
CN 101	PCB CONNECTOR 6P TX0-P06P-G1	1770989
CN 102	PCB CONNECTOR 3P TX0-P03P-G1 (L TYPE)	1770986
CN 103	CONNECTOR BASE 4P (EH/TOP)	1730628
CN 104	CONNECTOR BASE 3P (EH/TOP)	1730627

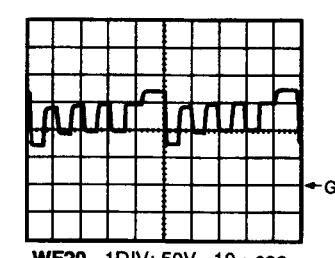
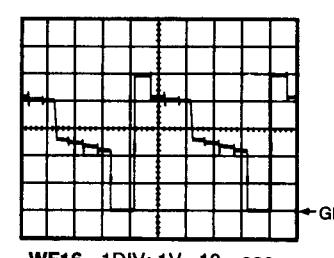
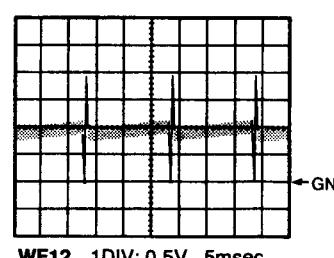
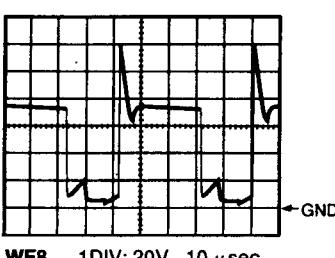
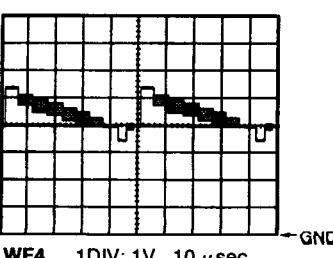
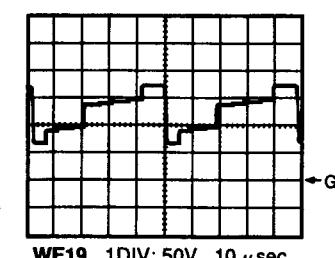
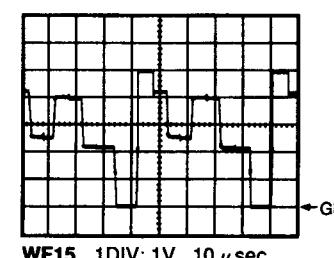
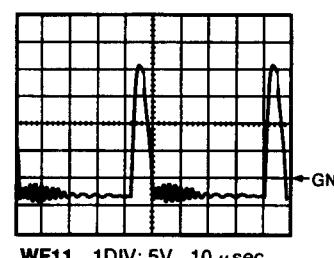
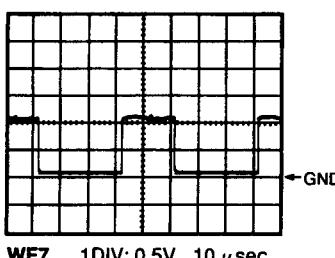
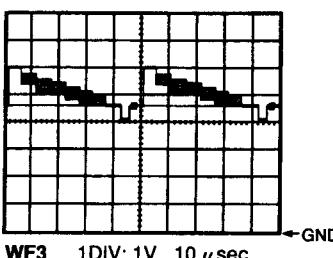
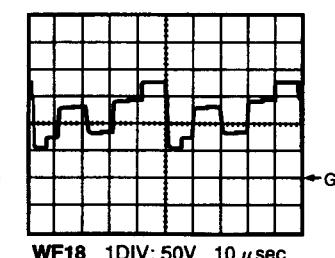
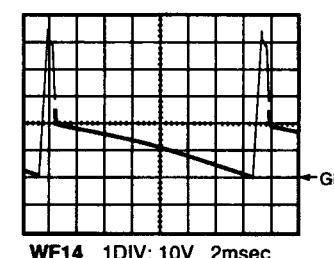
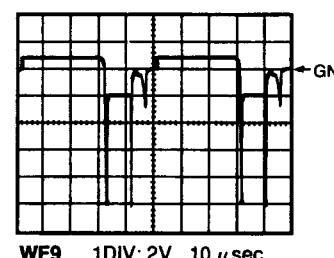
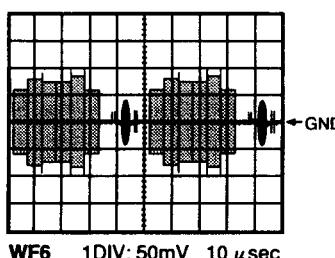
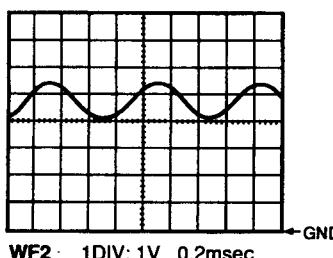
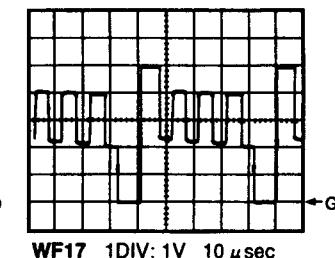
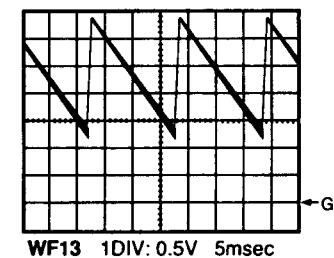
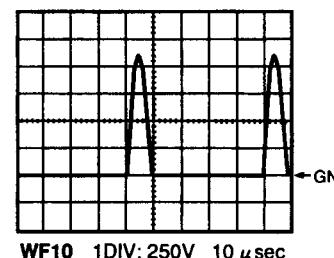
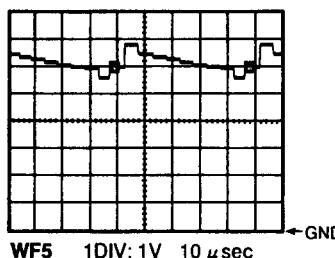
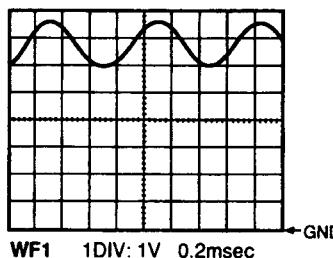
Ref. No.	Description	Part No.
L 101	MICRO INDUCTOR 1 $\mu$ H or	2165109T
L 102	MICRO INDUCTOR 1 $\mu$ H	2162109T
L 103	MICRO INDUCTOR 0.68 $\mu$ H or	2165688T
L 104	MICRO INDUCTOR 0.68 $\mu$ H	2162688T
L 105	MICRO INDUCTOR 10 $\mu$ H or	2165100T
L 106	MICRO INDUCTOR 10 $\mu$ H	2162100T
L 107	MICRO INDUCTOR 10 $\mu$ H	2165100T
TRANSISTORS		
Q 102	TRANSISTOR 2SC331(T) or	QSC331TNPA
	TRANSISTOR 2SC331(U) or	QSC331UNPA
	TRANSISTOR KTC3198GR TO-92 or	NOS40KTC3198
	TRANSISTOR KTC3199GR	NOS10KTC3199
Q 103	TRANSISTOR 2SC3000D or	2SC3000D
	TRANSISTOR 2SC3000E	2SC3000E
Q 104	TRANSISTOR 2SA1318T or	2SA1318T
	TRANSISTOR 2SA1318U or	2SA1318U
	TRANSISTOR KTA1267(GR)	NOS40KTA1266
TRANSISTORS		
R 101	CHIP RES. 1/10W J 470 $\Omega$	RRXAJBBZ0471
R 102	CHIP RES. 1/10W J 380 $\Omega$	RRXAJBBZ0391
R 103	CHIP RES. 1/10W J 470 $\Omega$	RRXAJBBZ0471
R 104	CHIP RES. 1/10W J 330 $\Omega$	RRXAJBBZ0331
R 105	CHIP RES. 1/10W J 5.6K $\Omega$	RRXAJBBZ0562
R 106	CHIP RES. 1/10W J 1.8K $\Omega$	RRXAJBBZ0182
R 107	CHIP RES. 1/10W J 22K $\Omega$	RRXAJBBZ0223
R 108	CHIP RES. 1/10W J 560 $\Omega$	RRXAJBBZ0561
R 109	CHIP RES. 1/10W J 10K $\Omega$	RRXAJBBZ0103
R 110	CHIP RES. 1/10W J 560 $\Omega$	RRXAJBBZ0561
R 111	CHIP RES. 1/10W J 1.5K $\Omega$	RRXAJBBZ0152
R 112	CHIP RES. 1/10W J 82K $\Omega$	RRXAJBBZ0823
R 113	CHIP RES. 1/10W J 180K $\Omega$	RRXAJBBZ0184
R 114	CHIP RES. 1/10W J 330 $\Omega$	RRXAJBBZ0331
R 115	CHIP RES. 1/10W J 560 $\Omega$	RRXAJBBZ0561
R 116	CHIP RES. 1/10W J 560 $\Omega$	RRXAJBBZ0561
R 117	CHIP RES. 1/10W J 5.6K $\Omega$	RRXAJBBZ0562
R 118	CHIP RES. 1/10W J 33 $\Omega$	RRXAJBBZ0330
R 119	CHIP RES. 1/10W J 1.5K $\Omega$	RRXAJBBZ0152
R 120	CHIP RES. 1/10W J 68 $\Omega$	RRXAJBBZ0680
R 121	CHIP RES. 1/10W J 120K $\Omega$	RRXAJBBZ0124
R 122	CHIP RES. 1/10W J 100K $\Omega$	RRXAJBBZ0104
R 123	CHIP RES. 1/10W J 1.8K $\Omega$	RRXAJBBZ0182
R 124	CHIP RES. 1/10W J 1.8K $\Omega$	RRXAJBBZ0182
R 125	CHIP RES. 1/10W J 1K $\Omega$	RRXAJBBZ0102

Ref. No.	Description	Part No.
R 126	CHIP RES. 1/10W J 3.3K $\Omega$	RRXAJBBZ0332
R 129	CHIP RES. 1/10W J 120 $\Omega$	RRXAJBBZ0121
R 130	CHIP RES. 1/10W J 1.5K $\Omega$	RRXAJBBZ0152
R 131	CHIP RES. 1/10W J 560 $\Omega$	RRXAJBBZ0561
R 132	CHIP RES. 1/10W J 100 $\Omega$	RRXAJBBZ0101
JW 235	CHIP RES. 1/10W J 0 $\Omega$	RRXAJBBZ0000
JW 236	CHIP RES. 1/10W J 0 $\Omega$	RRXAJBBZ0000
JW 237	CHIP RES. 1/10W J 0 $\Omega$	RRXAJBBZ0000
JW 239	CHIP RES. 1/10W J 0 $\Omega$	RRXAJBBZ0000
VARIABLE RESISTOR		
VR 101	POTENTIOMETER 10K $\Omega$ B V	138JB17
MISCELLANEOUS		
CF 101	CERAMIC DISCRE CDA5.5MC26	1812020
CF 102	CERAMIC DISCRE CDA6.5MC26	1813504
CF 103	CERAMIC TRAP TPW02B	1815935
CF 104	CERAMIC FILTER SFE5.5MBF	1812018
CF 105	CERAMIC FILTER SFE6.5MB	1813595
IC 101	IC LA7530N	14L0162
SAW101	SAW FILTER KAF-38.0MR-MH	

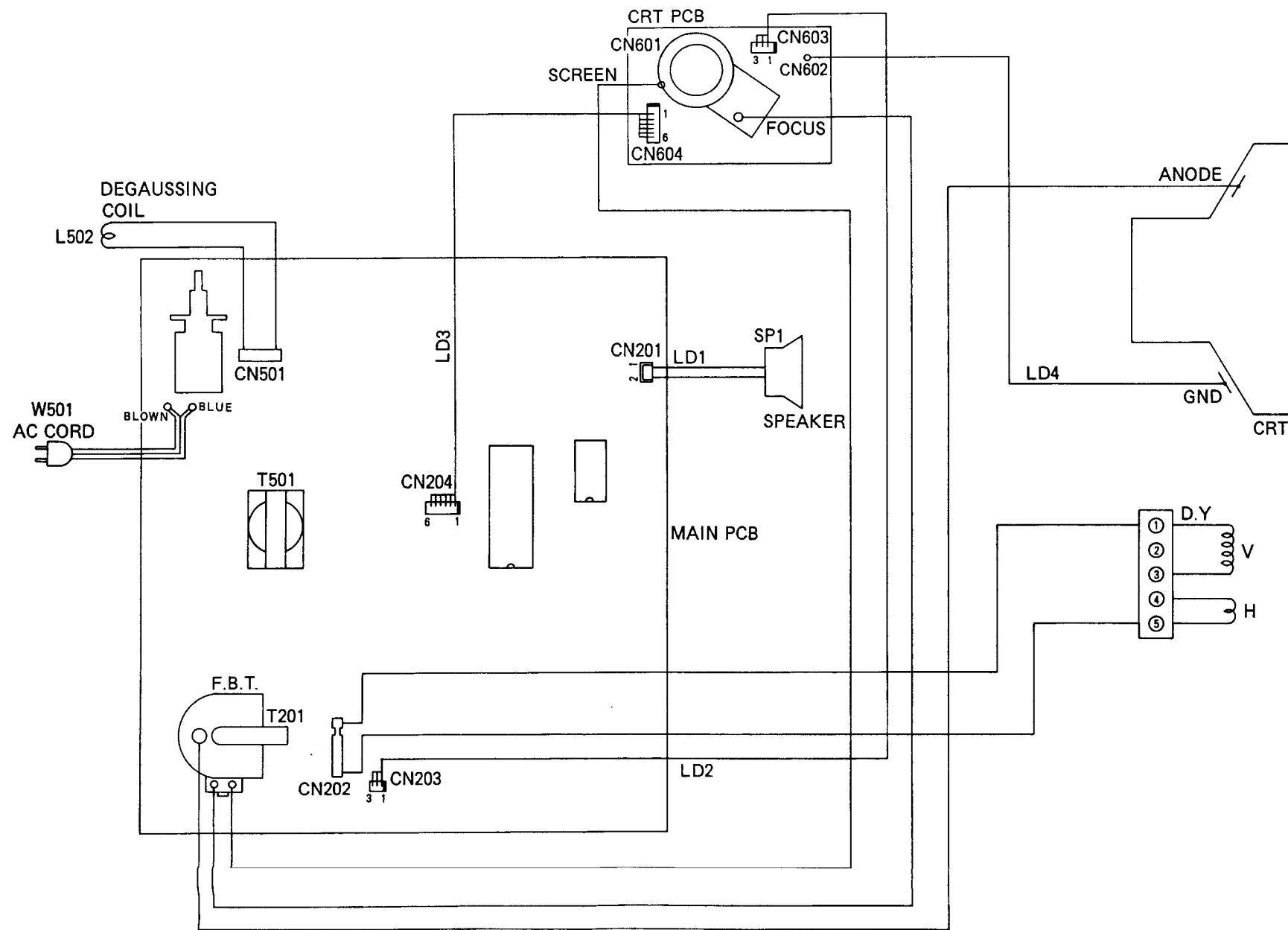
## WAVEFORMS

WF1 ~ WF20 = Waveforms to be observed at Waveform check points.  
(Shown in Schematic Diagram.)

INPUT : PAL Color Bar Signal (with 1KHz Audio Signal)  
RECEIVING CH. : E2 ch (48.25 MHz)  
PRESET MODE : Press Picture Select button on the remote control unit,  
then press the number "1" button.  
(Brightness--- Center Color--- Center Contrast--- Approx 70%)



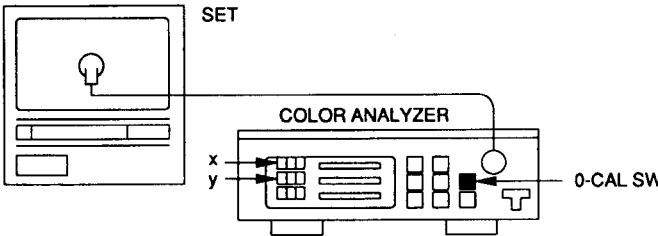
## WIRING DIAGRAM



## 15. WHITE BALANCE ADJUSTMENT

**Purpose:** To mix red, green and blue beams correctly for pure white.

**Symptom of Misadjustment:** White becomes bluish or reddish.

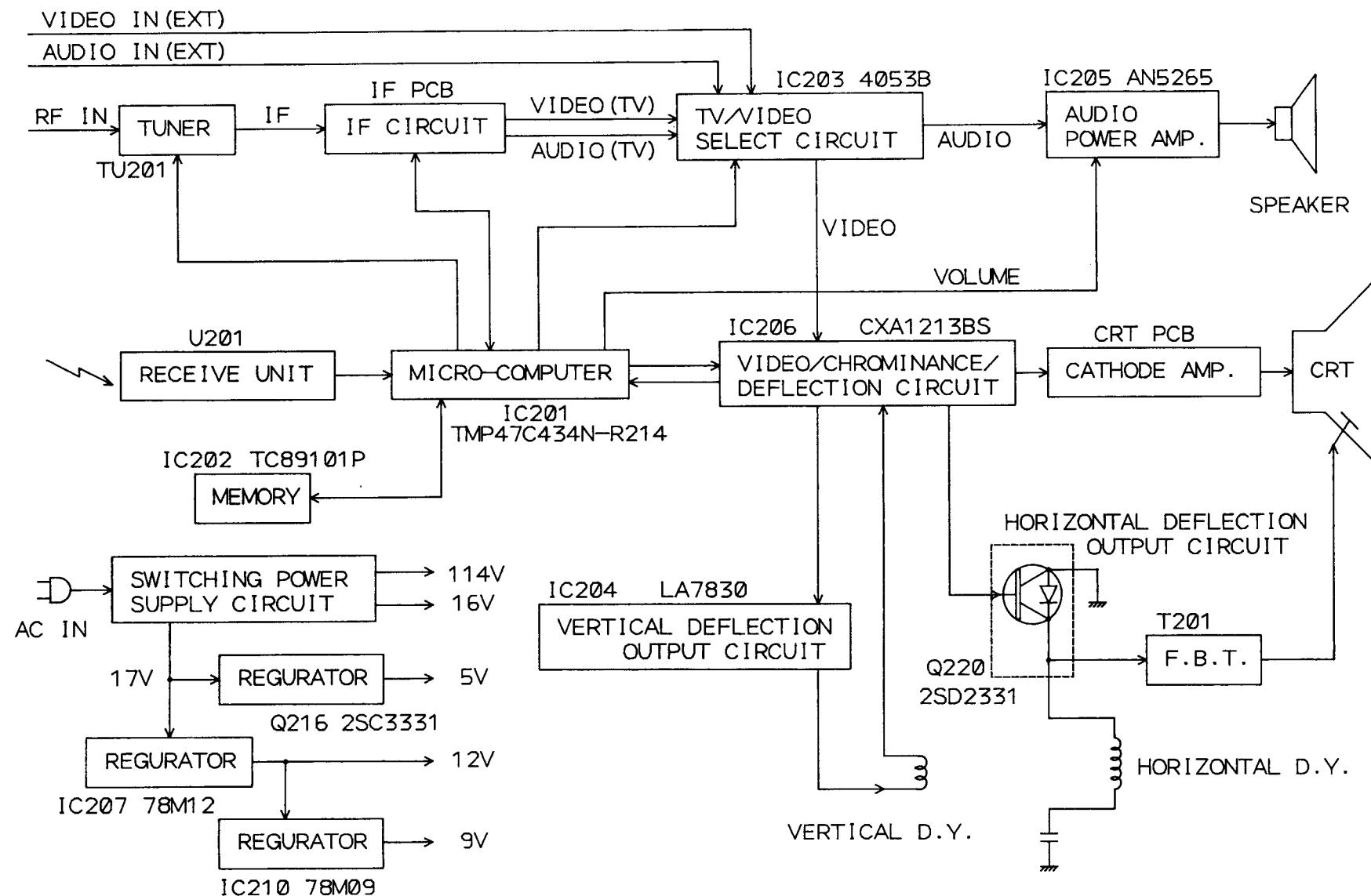
Test Point	Adjustment Point	Input
Screen	VR602, VR603	White Raster (APL 100%)
Equipment		Spec.
Pattern Generator		See below
Color Analyzer		
<b>Connections of M. EQ.</b>		
		

**Reference Notes:** VR602, VR603 --- CRT PCB

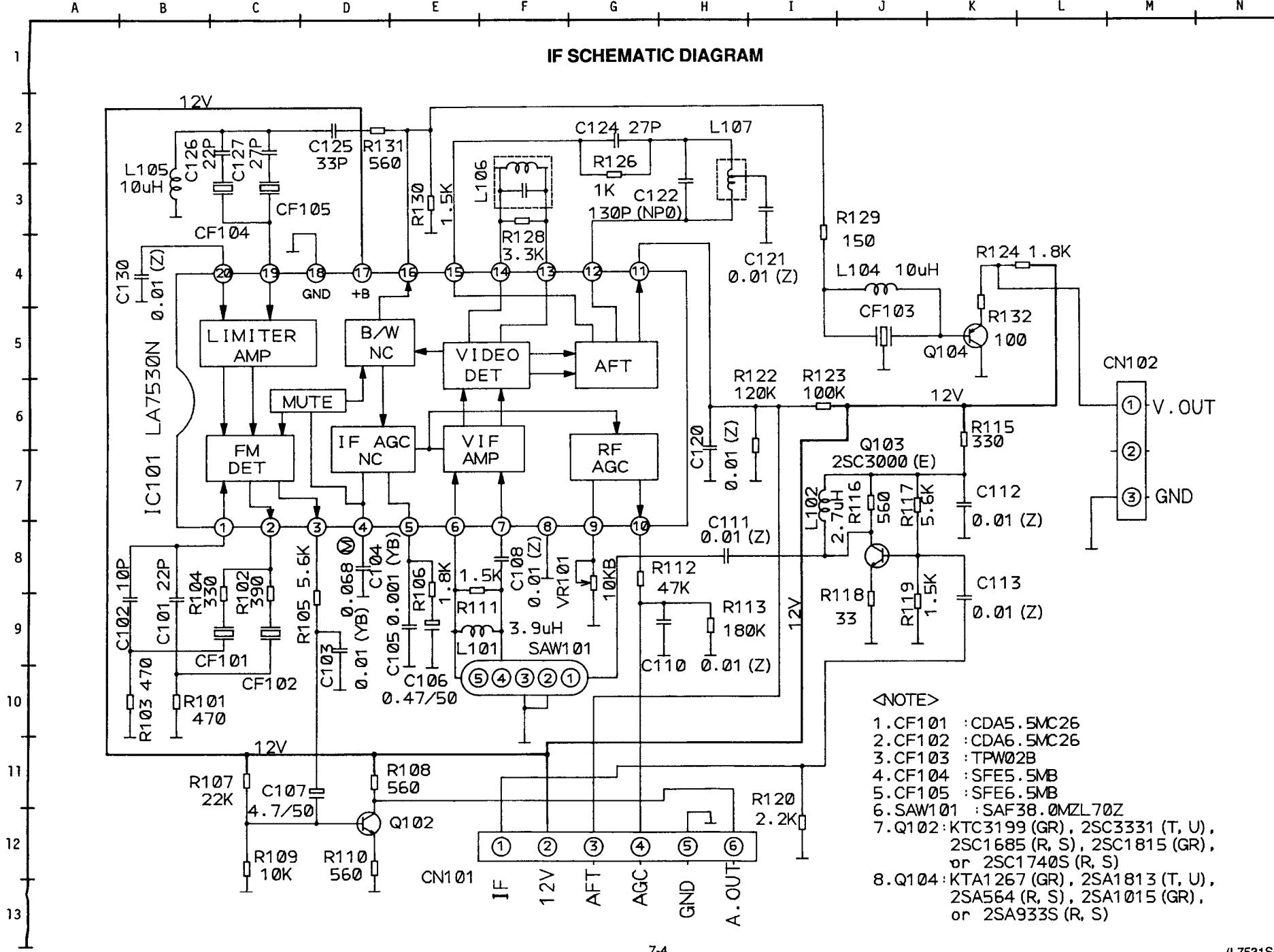
1. Operate the unit more than 20 minutes.
2. Face the unit to east. Degauss the CRT using Degaussing Coil.
3. Input the White Raster (APL 100%).
4. Set the color analyzer to the CHROMA mode and after zero point calibration, bring the optical receptor to the center on the tube surface (CRT).
5. Adjust VR603 (R. DRIVE) and VR602 (B. DRIVE) so that the respective chroma temperatures become 8000K-10MPCD ( $x : 0.300$  /  $y : 0.290 \pm 4\%$ ).

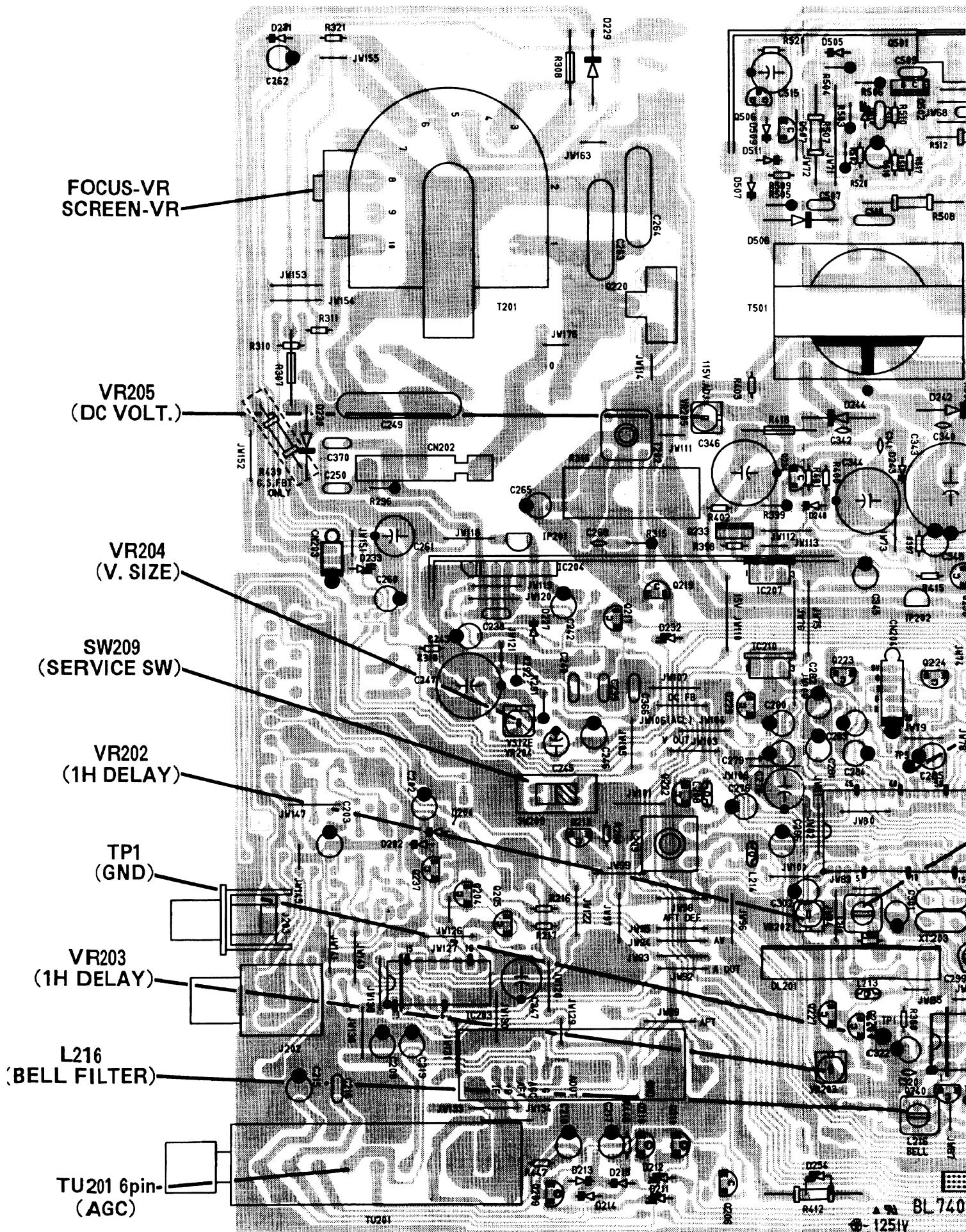
**Note:** Confirm that Cut Off Adj. is correct after this adjustment, and attempt Cut Off Adj. if needed.

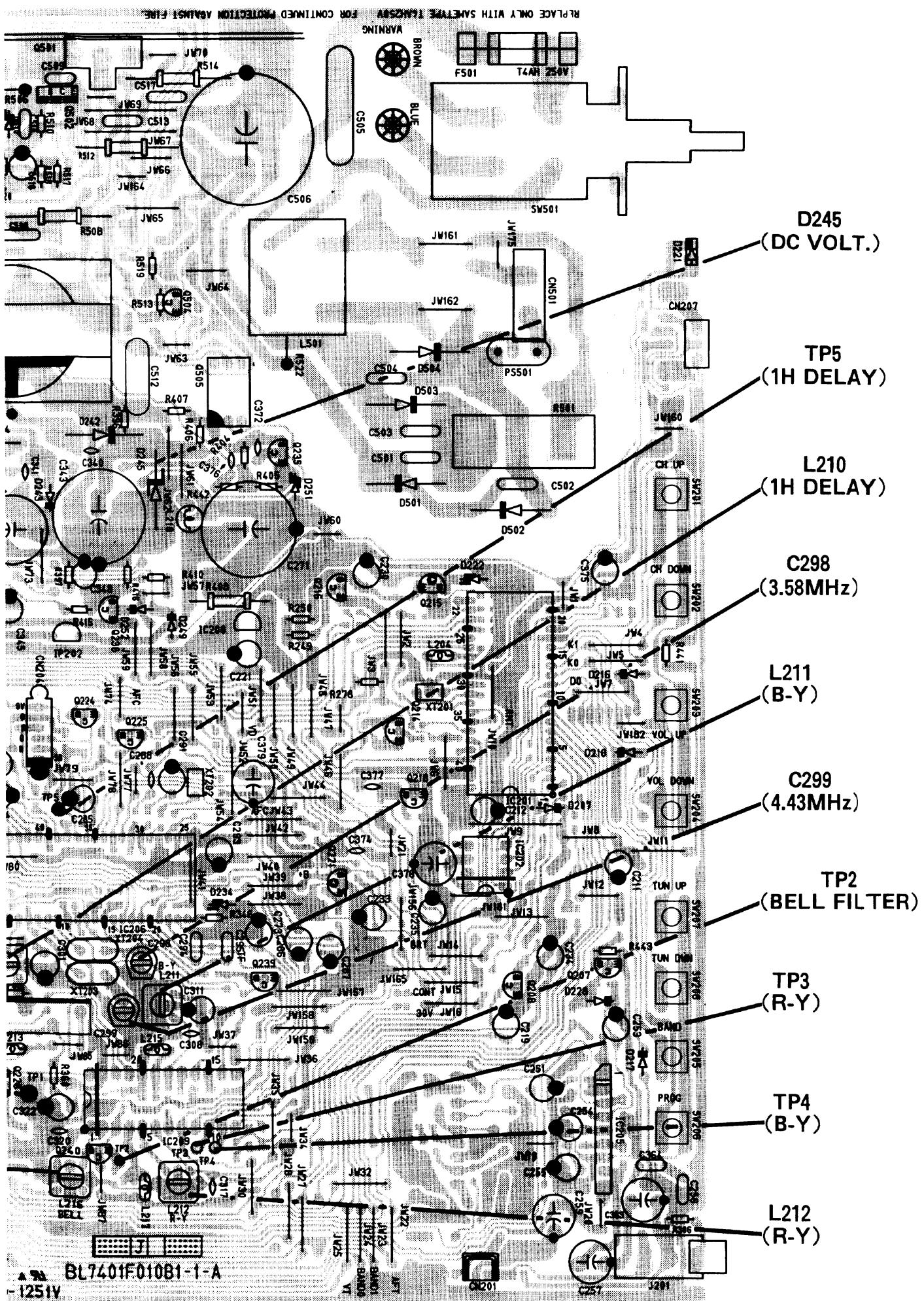
## BLOCK DIAGRAM



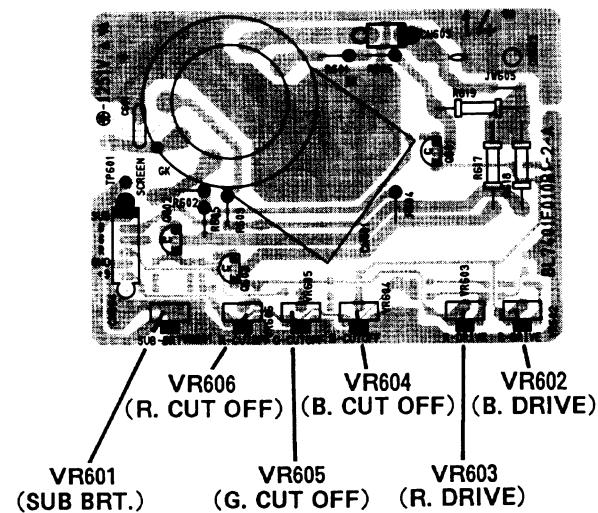
# IF SCHEMATIC DIAGRAM



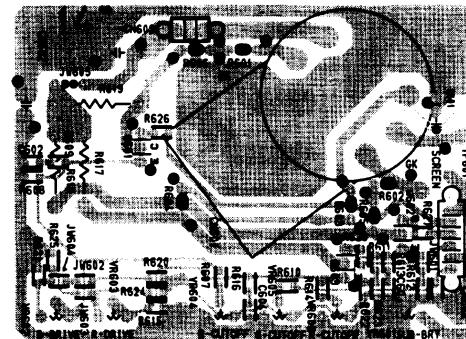




**CRT PCB (Top View)**

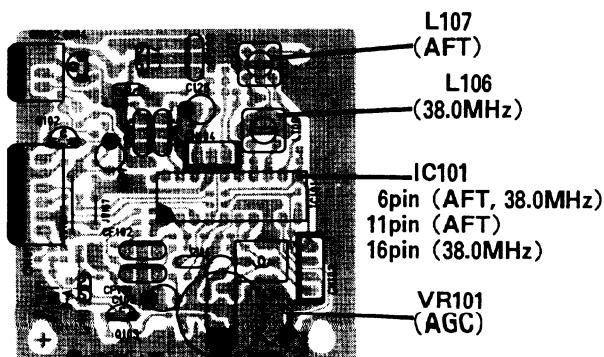


**CRT PCB (Bottom View)**

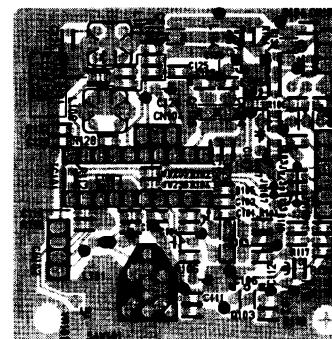


(BL7401F010B1-2-A)

**IF PCB (Top View)**

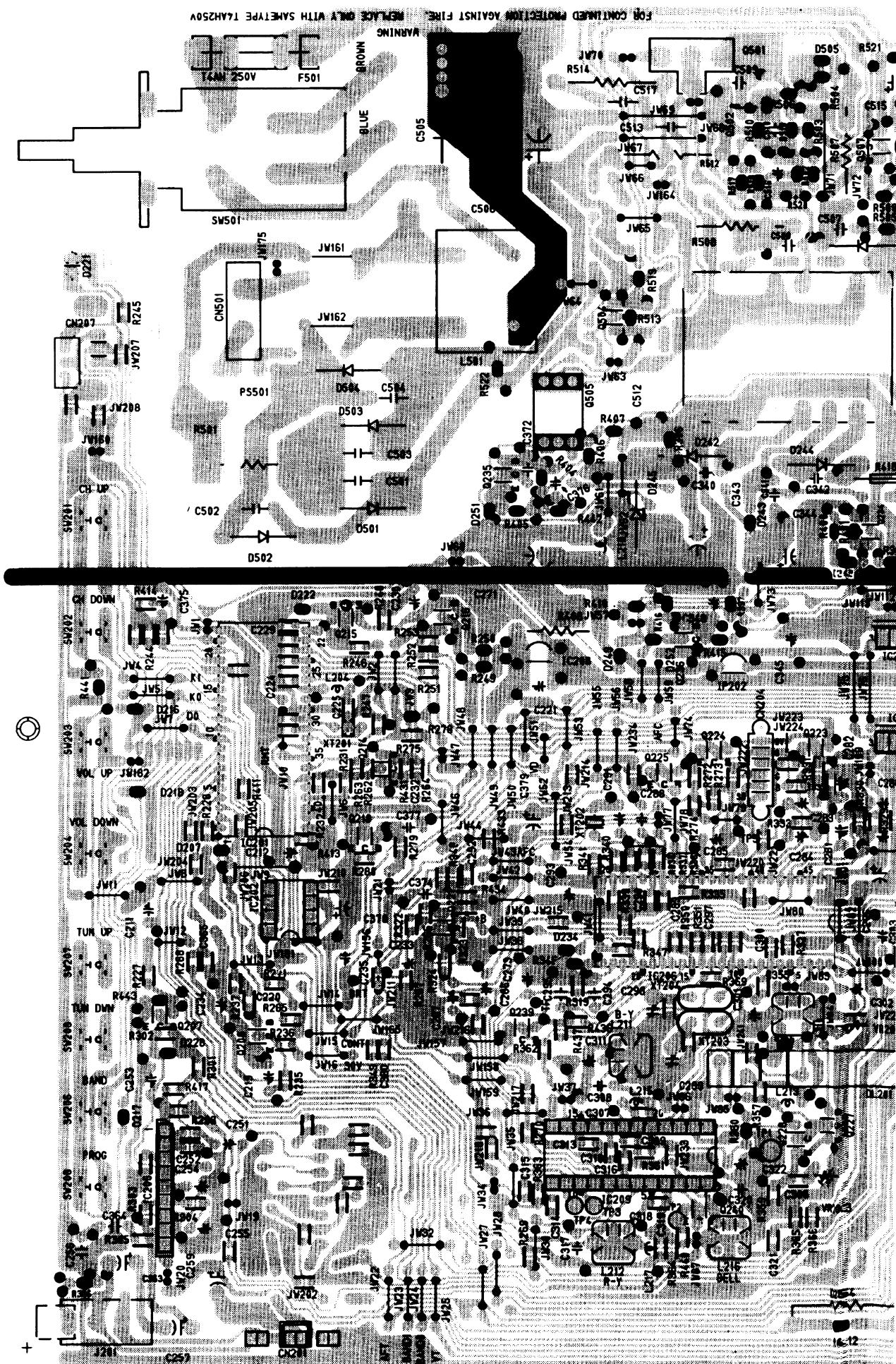


**IF PCB (Bottom View)**



(BL7401F010B1-3-A)

## MAIN PCB (Bottom View)



**(Bottom View)**

